# LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT CRUISE FAN V/STOL CONFIGURATION

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This report is Volume II to CR 152247 and contains a compilation of test		
results. Data are presented without comment for a lift-cruise-fan V/STOL		
configuration in near proximity to the edge of a small flat surface representation of a ship deck. The model tested was a four-fan configuration with		
modifications to represent a three		
approximately 0.12.	ran configuration	on, Model Scale Was

# LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT CRUISE FAN V/STOL CONFIGURATION

BY V. R. STEWART

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# LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT-CRUISE-FAN V/STOL CONFIGURATION

Vearl R. Stewart Rockwell International Columbus Aircraft Division

APPENDIX A - WIND TUNNEL DATA

VOLUME II

TO SUMMARY REPORT CR-152247

### SYMBOLS

### Total Forces

```
lift, newtons (pounds)
L
             drag, newtons (pounds)
D
             pitching moment, newton meters (foot pounds)
М
             rolling moment, newton meters (foot pounds)
RM
T
             thrust, newtons (pounds)
             thrust, left hand side, newtons (pounds)
TL
TR
             thrust, right hand side, newtons (pounds)
         Thrust Induced Aerodynamic Forces (Power ON - Power OFF)
\Delta L
             lift, newtons (pounds)
\Delta D
             drag, newtons (pounds)
             pitching moment, newton meters (foot pounds)
\Delta M
\DeltaRM
             rolling moment, newton meters (foot pounds)
                      Total Coefficients (Stability Axis)
CL
             lift coefficient, L/qS
CD
             drag coefficient, D/qS
             pitching moment coefficient, M/qSc
CM
             rolling moment coefficient RM/qS
C_{RM}
                               Thrust Coefficients
C_{T}
             thrust coefficient, T/qS
\Delta C_{\mathrm{LT}}
             lift coefficient due to thrust
\Delta C_{D_{\mathbf{T}}}
             drag coefficient due to thrust
\Delta C_{MT}
             pitching moment coefficient due to thrust
\Delta C_{RM_T}
             rolling moment coefficient due to thrust
\Delta C_{YMT}
             yawing moment coefficient due to thrust
             pitching moment coefficient due to ram drag
\Delta C_{MD}
             ram drag coefficient \sim \frac{M_1 \text{ V}}{\text{GS}}
C_{D_R}
             Aerodynamic Coefficients (Thrust Effects Removed)
             lift coefficient
C_{LA}
C_{DA}
             drag coefficient
C_{MA}
             pitching moment coefficient
CRMA
             rolling moment coefficient
```

### Angles

```
\alpha, Alfa
            angle of attack, degrees
Ø
            bank angle, degrees
\theta_{T}
             thrust angle, degrees
\delta_{N}
          nozzle angle - geometric angle, degrees
δNFwd
            nacelle forward nozzle angle, degrees
<sup>δN</sup>Aft
            nacelle aft nozzle angle, degrees
            nose nozzle angle, degrees
δNNose
βĺ
            sideslip angle, degrees
                                   Dimensions
S
            wing area - 0.7767 \text{ m}^2
b
            wing span - 2.502 m
С
            wing mean aerodynamic chord - 0.3231 m
            lateral dimension, meters (feet)
У
х
            fuselage dimension, meters (feet)
            vertical dimension, meters (feet)
H/D, h/D
            non-dimensional ground height
                 height of fuselage/diameter of one fan
D
            equivalent diameter of one fan - (0.13 m) model
                                                   (1.083 m) full scale airplane
\ell_1
            horizontal ram drag arm, see Figure 17, meters (feet)
£2.
            vertical thrust arm, see Figure 17, meters (feet)
\ell_3
            vertical ram drag arm, see Figure 17, meters (feet)
\ell_{\!\scriptscriptstyle L}
            horizontal thrust arm, see Figure 17, meters (feet)
\ell_5
            lateral thrust arm, see Figure 17, meters (feet)
                                  Miscellaneous
V
            wind velocity, meters/sec (feet/sec)
            nozzle exit velocity, meters/sec (feet/sec)
۷i
            pressure ratio, Pr/Pa
P_{R}
Pτ
            total pressure behind fan, pascals (pounds/in2)
            ambient pressure, pascals (pounds/in2)
P<sub>a</sub>
            dynamic pressure \sim 1/2 \rho V^2, newtons/meter<sup>2</sup> (pounds/foot<sup>2</sup>)
q
            air density, kg/meter<sup>3</sup> (pounds/foot<sup>3</sup>)
ρ
M_{i}
            inlet mass flow, kg/sec (pounds/sec)
```

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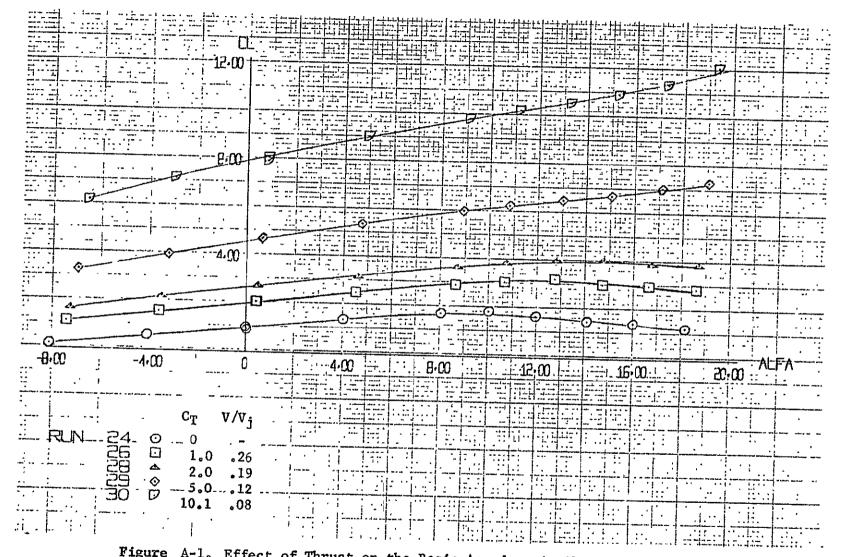


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_{N_{Fwd}}$  = 30°,  $\delta_{N_{Aft}}$  = 60°

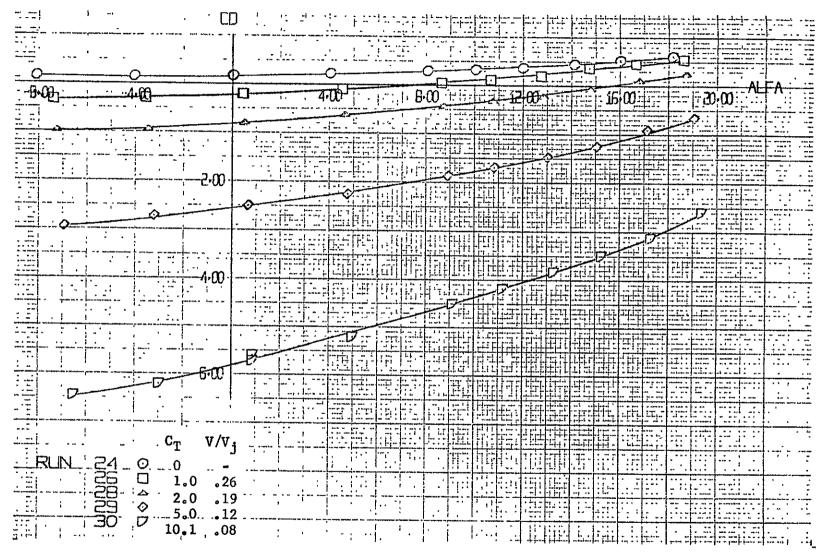


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60° (Continued)

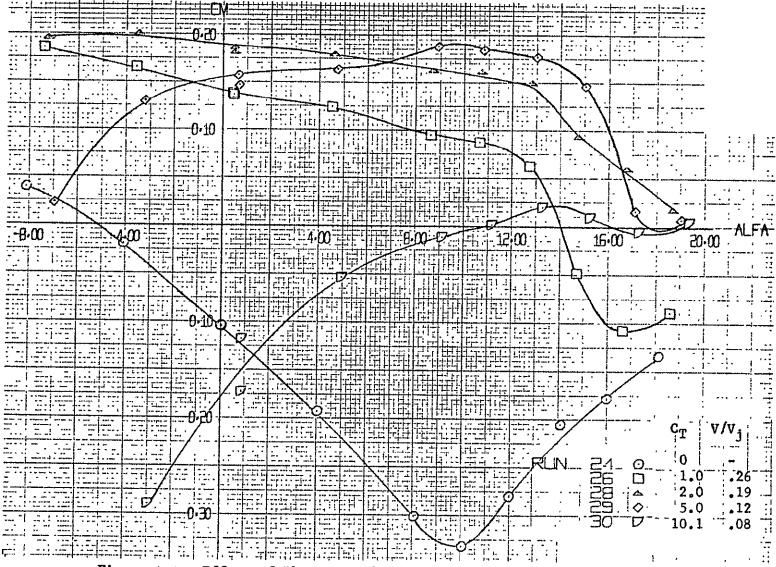
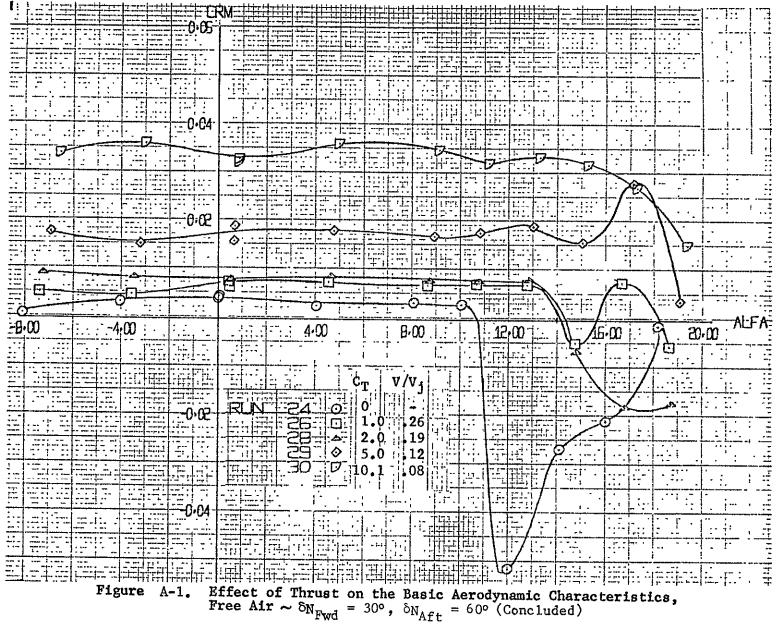


Figure A-1. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N_{Fwd}} = 30^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 60^{\circ}$  (Continued)



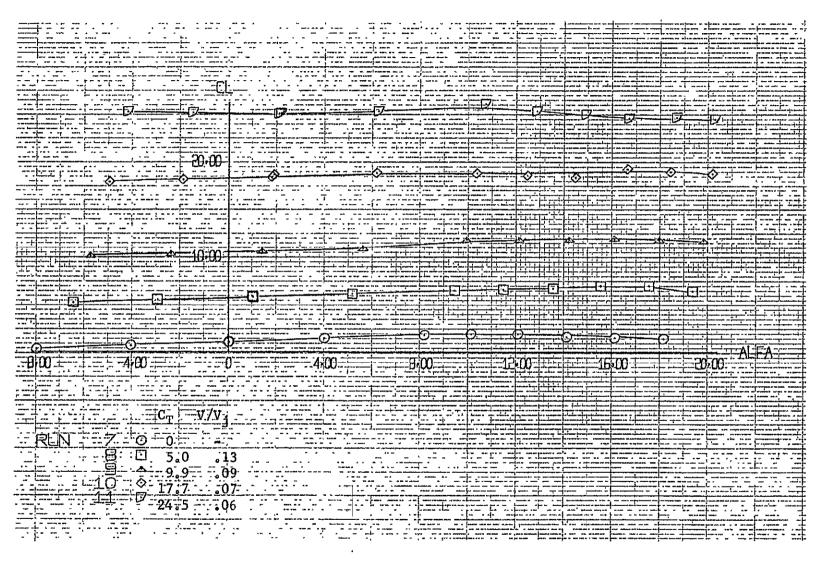


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  =  $90^{\rm O}$ 

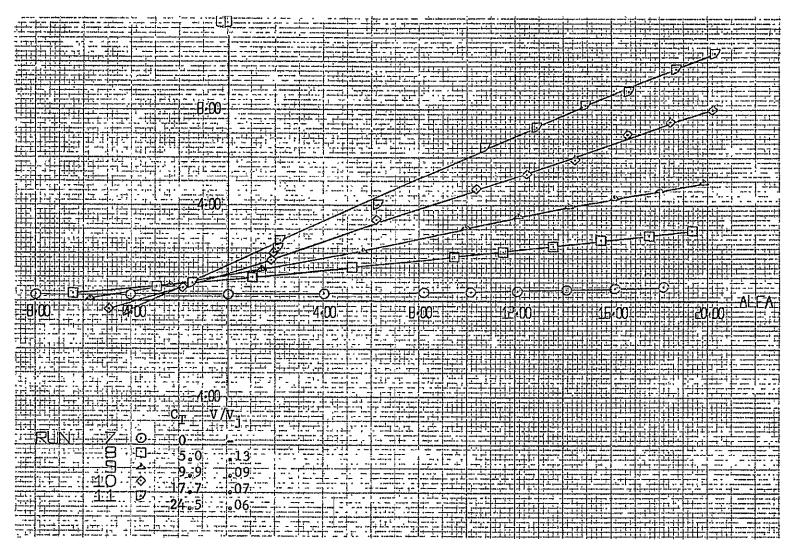


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics. Free Air  $\sim \delta_N = 90^\circ$  (Continued)

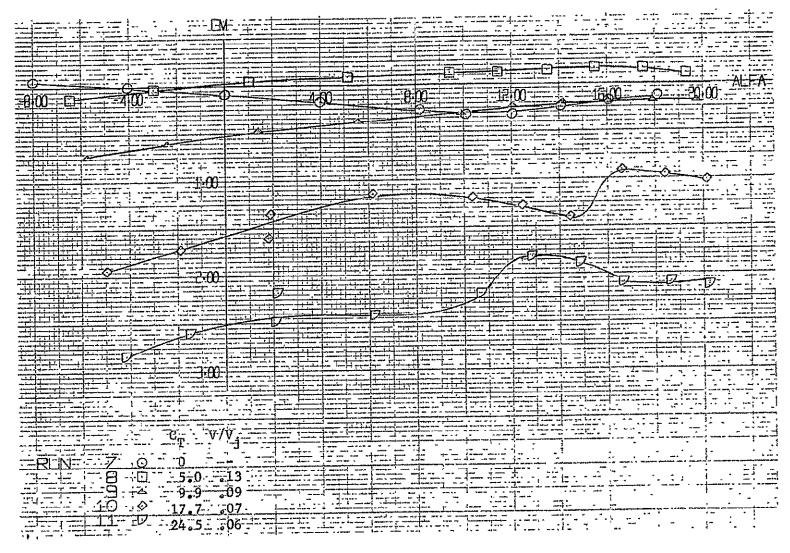


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  = 90° (Continued)

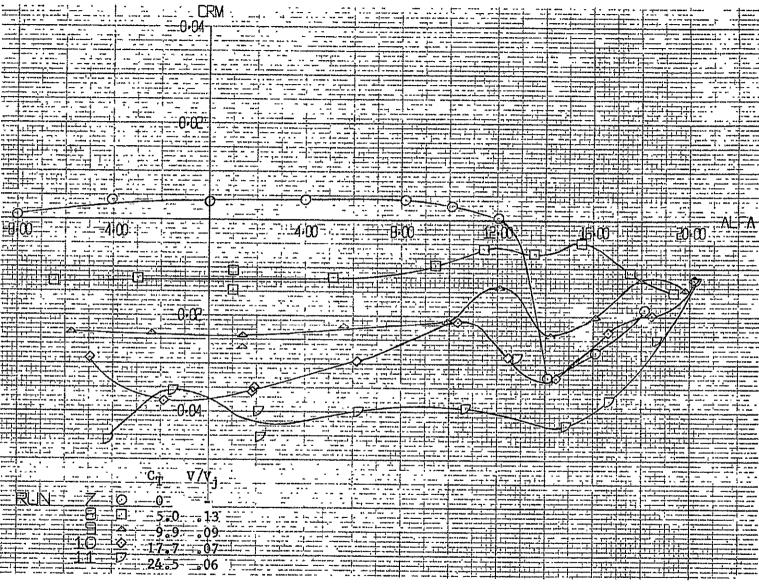


Figure A-2. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  =  $90^{\rm O}$  (Concluded)

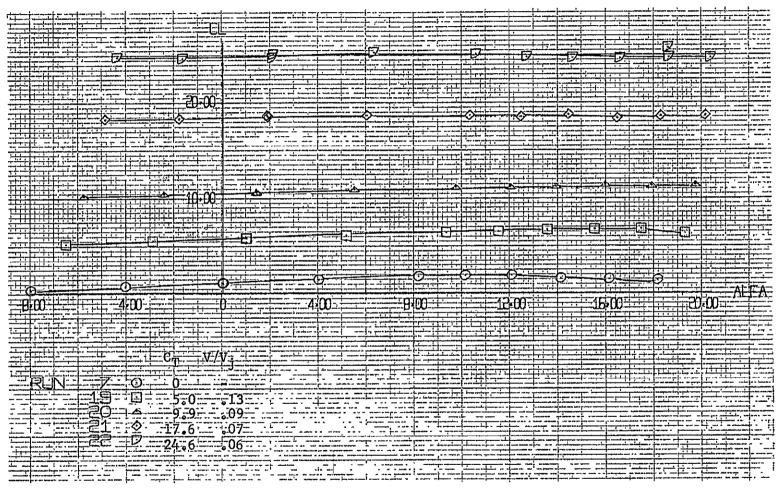


Figure A=3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_{\rm N}$  = 90°, Lateral Control In;  $\rm T_R/T_L$  = .8

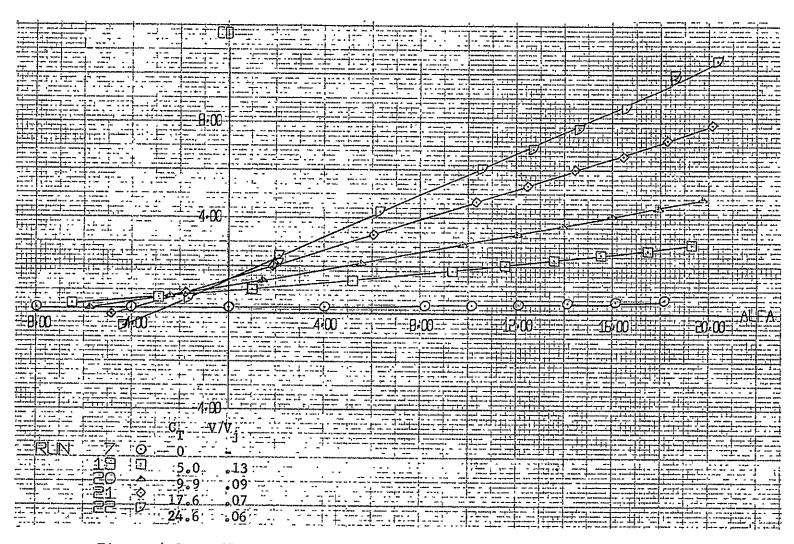


Figure A=3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_{\rm N}$  = 90°, Lateral Control In;  $T_{\rm R}/T_{\rm L}$  = .8 (Continued)

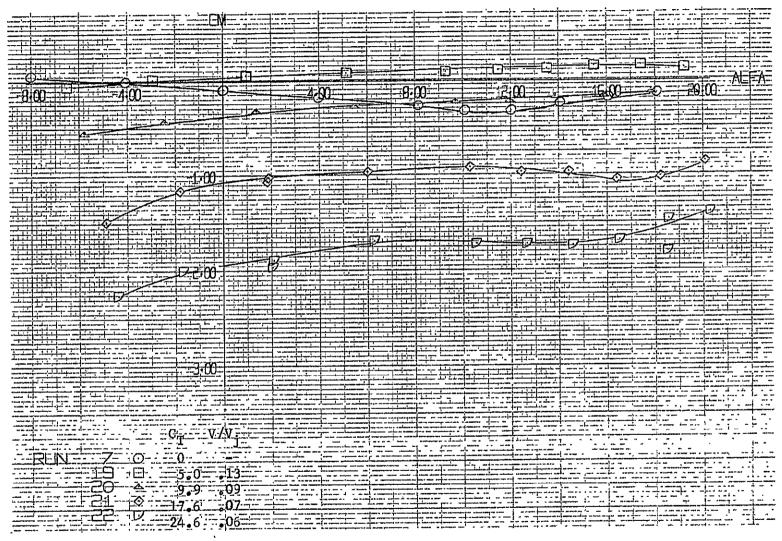


Figure A-3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  = 90°, Lateral Control In;  $\rm T_R/T_L$  = .8 (Continued)

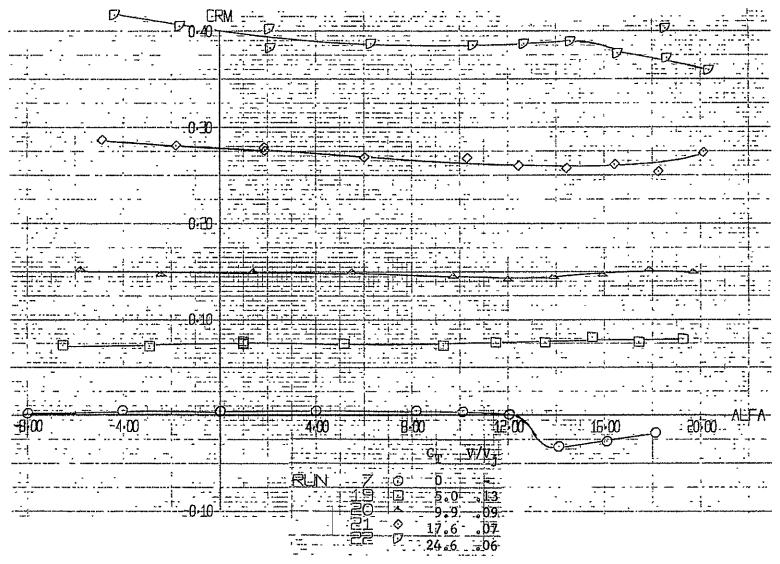


Figure A-3. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  = 90 , Lateral Control In;  $T_{\rm R}/T_{\rm L}$  = .8 (Concluded)

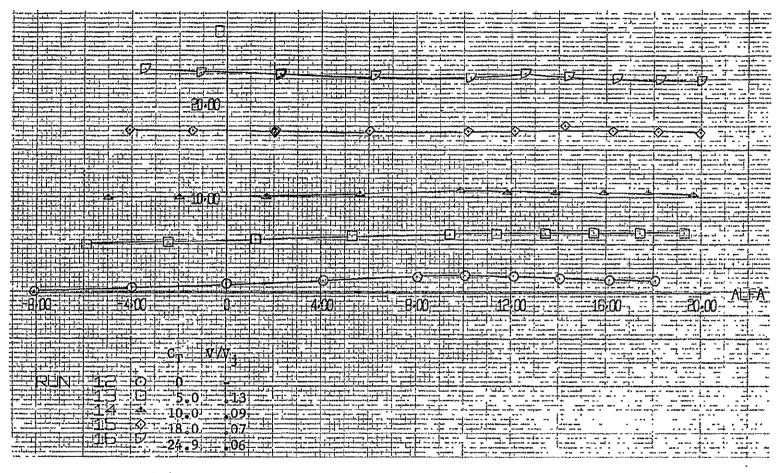


Figure A=4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_N$  =  $105^{\circ}$ 

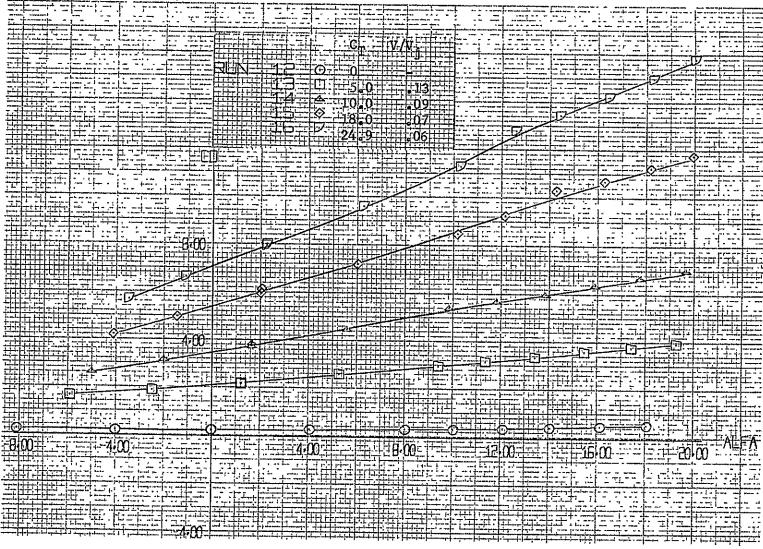


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  =  $105^{\rm O}$  (Continued)

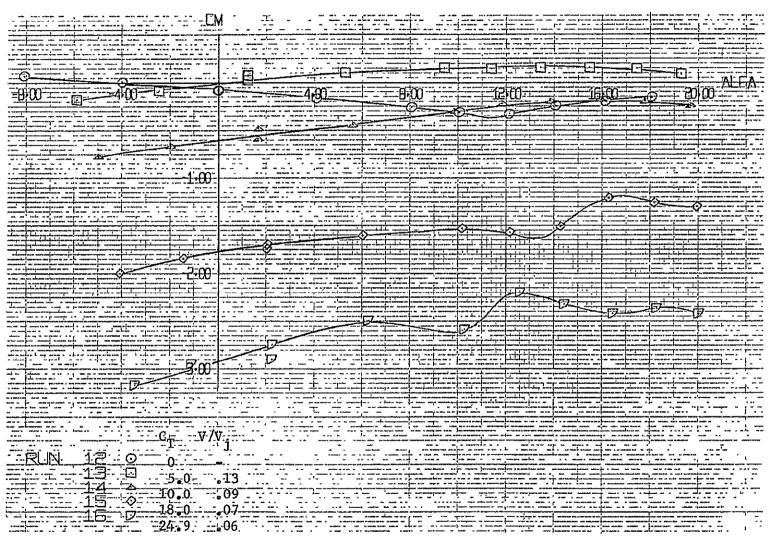


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  =  $105^{\rm o}$  (Continued)

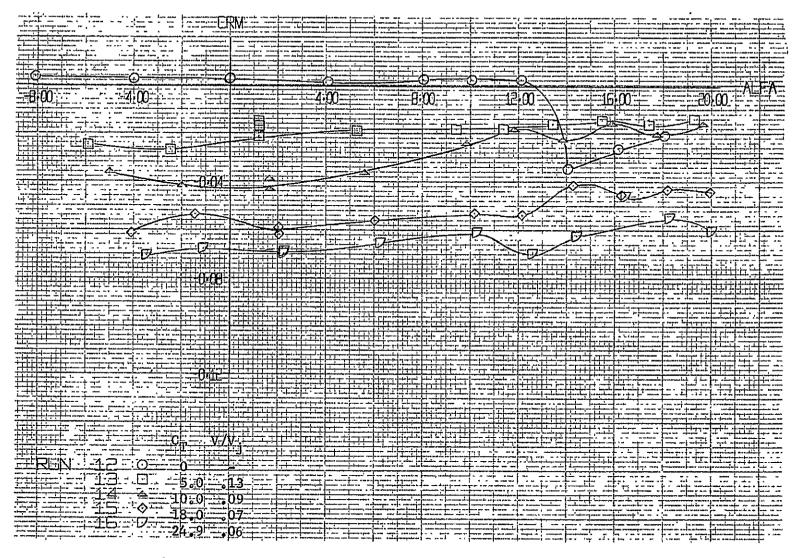


Figure A-4. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_N$  =  $105^o$  (Concluded)

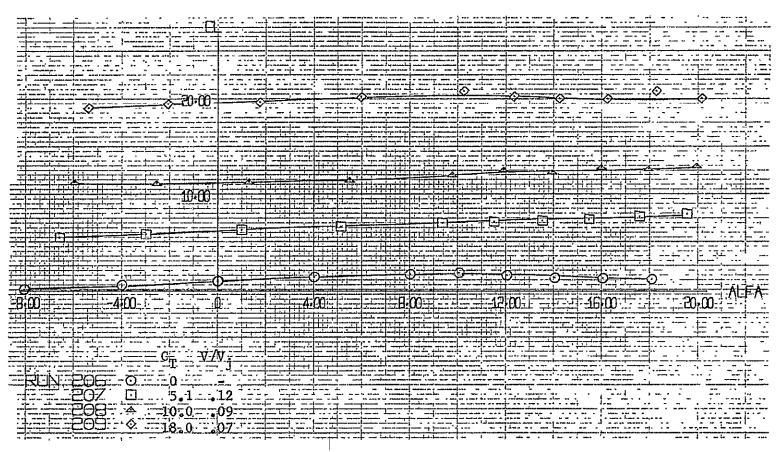


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_{\rm N}$  = 80°, 90°, 90°

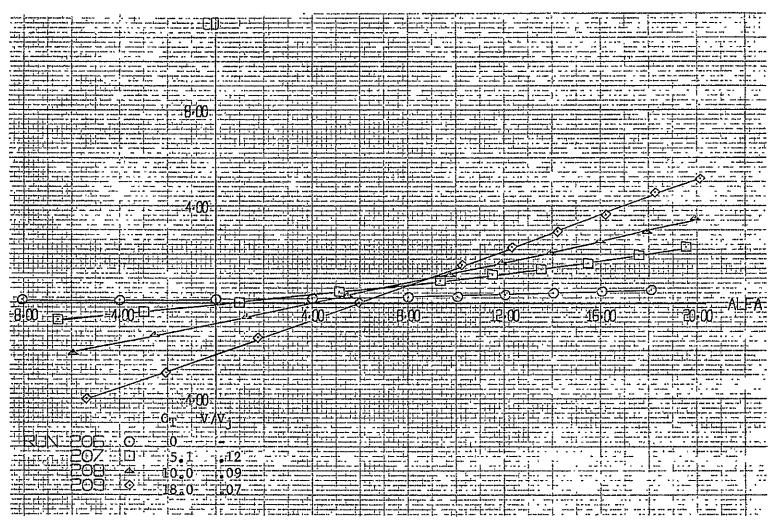


Figure A=5. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_N$  = 80°, 90° (Continued)

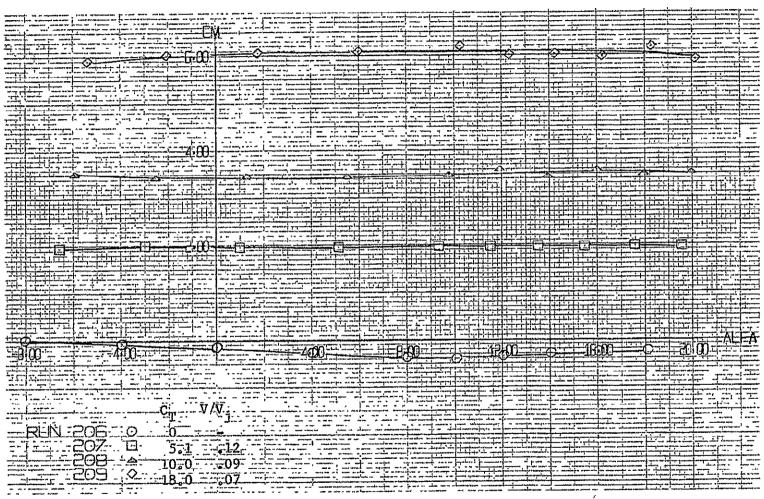


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim \delta_{\rm N}$  = 80°, 90°, 90° (Continued)

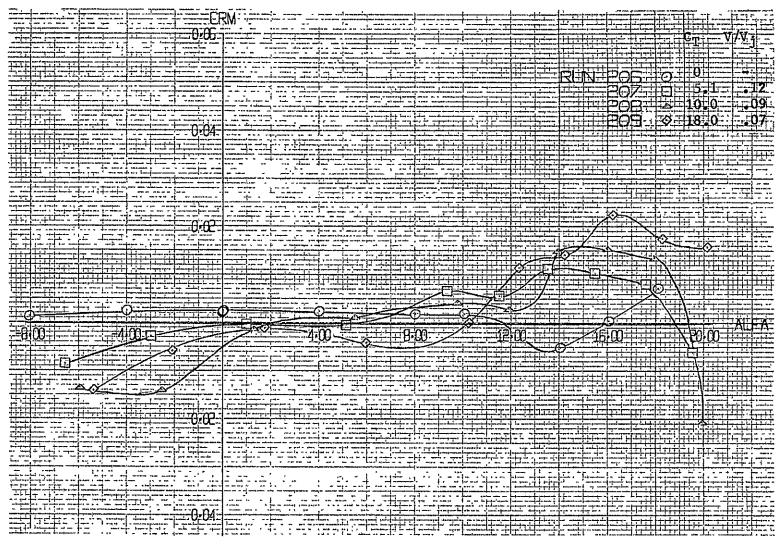


Figure A-5. Effect of Thrust on the Basic Aerodynamic Characteristics, Free Air  $\sim$   $\delta_{\rm N}$  =  $80^{\rm O},~90^{\rm O}$  (Concluded)

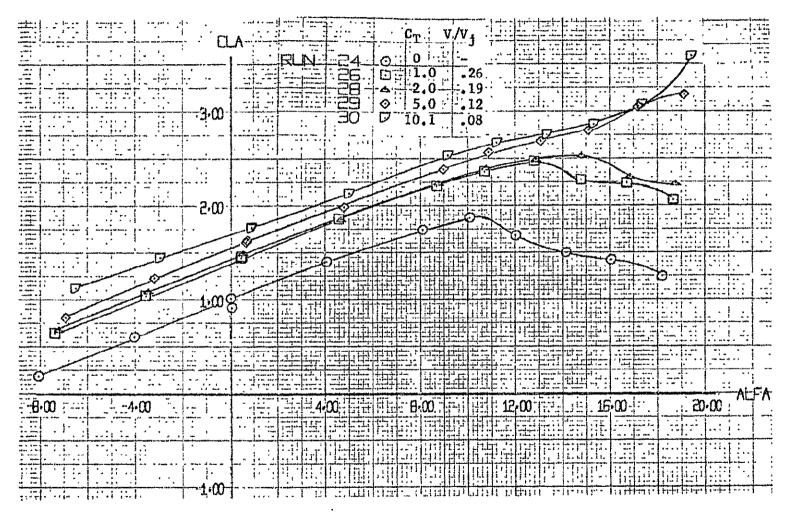


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ 

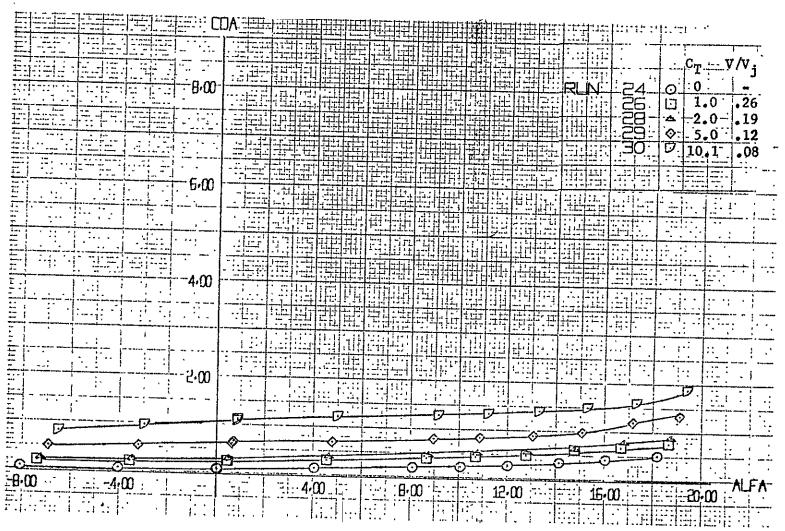


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N,Fwd} = 30^{\rm o}$ ,  $\delta_{\rm N,Aft} = 60^{\rm o}$  (Continued)

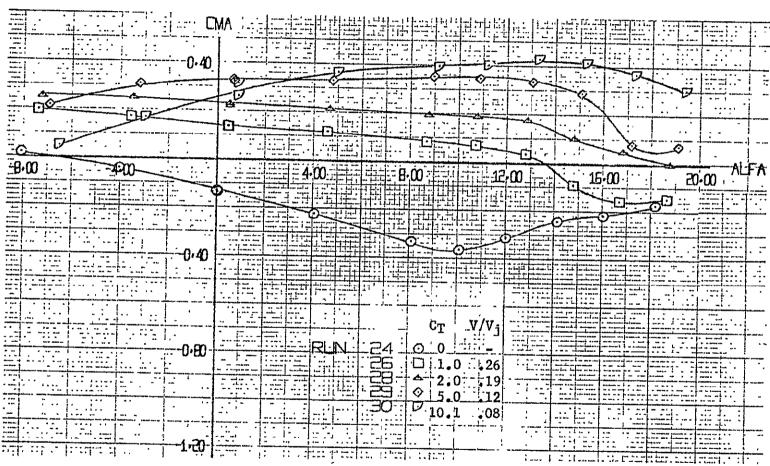


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$  (Continued)

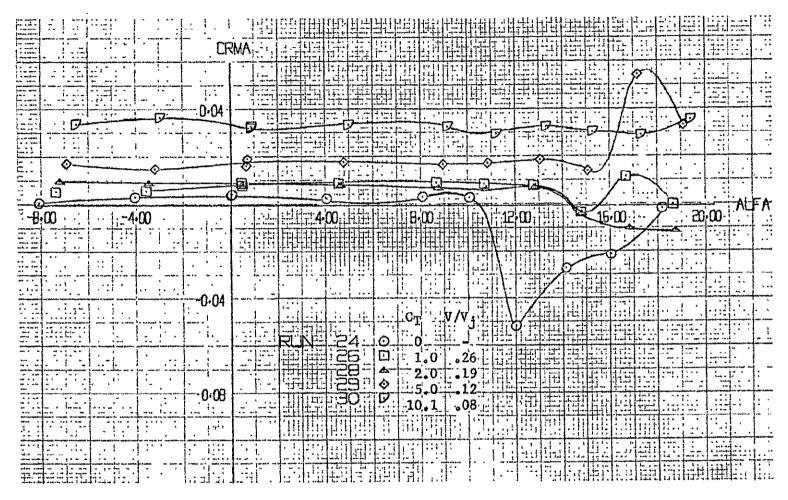


Figure A-6. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm NFwd} = 30^{\circ}$ ;  $\delta_{\rm NAft} = 60^{\circ}$  (Concluded)

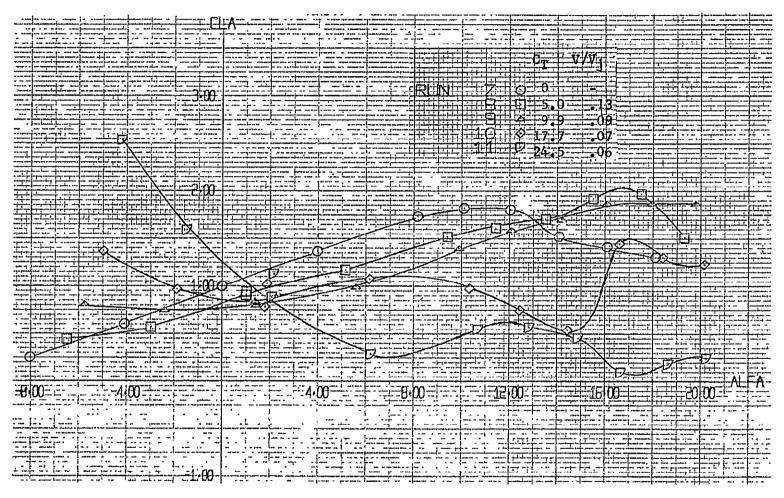


Figure A=7. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim$   $\delta_{\rm N}$  =  $90^{\circ}$ 

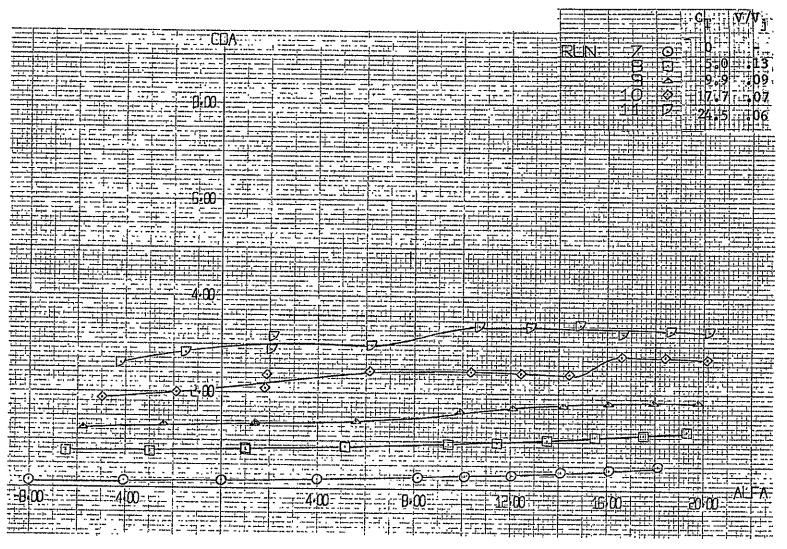
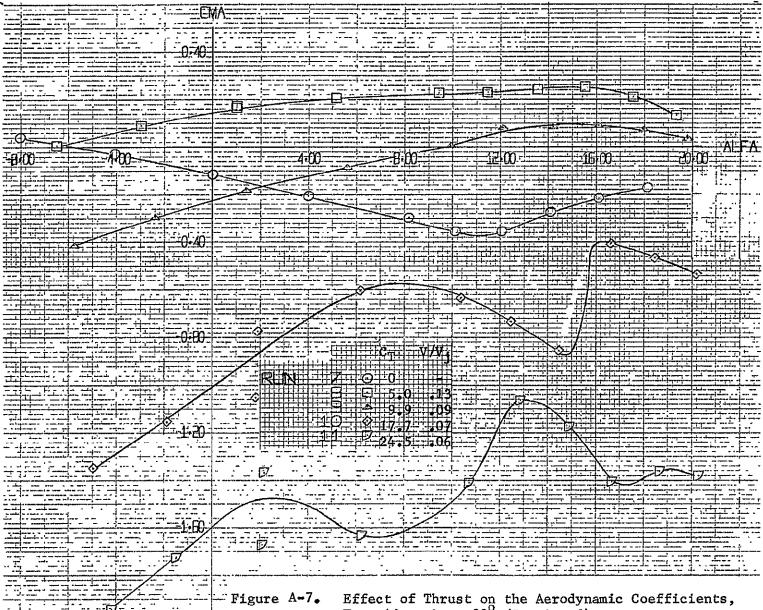


Figure A=7. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_N = 90^\circ$  (Continued)



Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  =  $90^{\circ}$  (Continued)

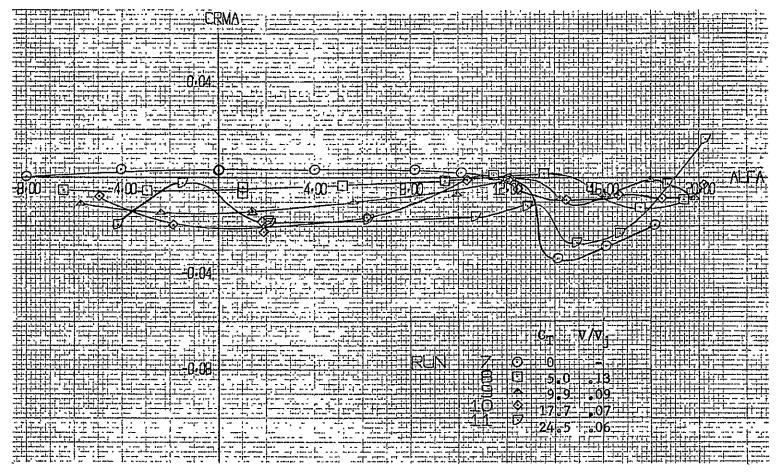


Figure A=7. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  = 90° (Concluded)

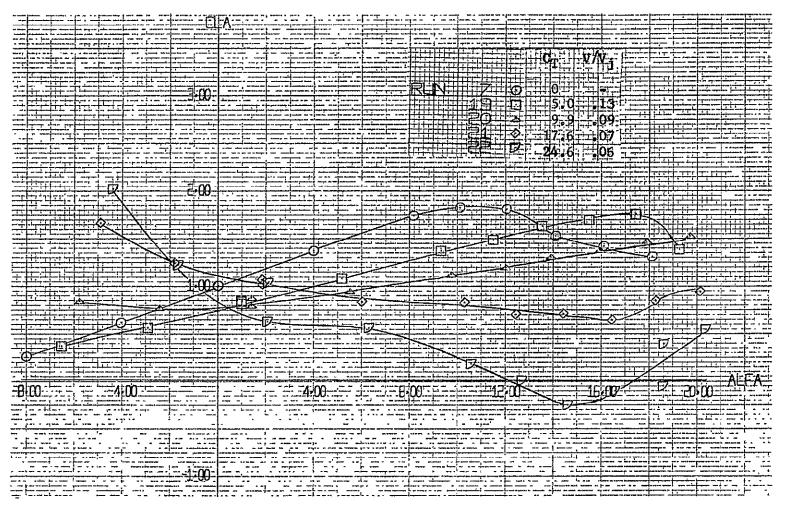


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim$   $\delta_N$  = 90°, Lateral Control In;  $T_R/T_L$  = .8

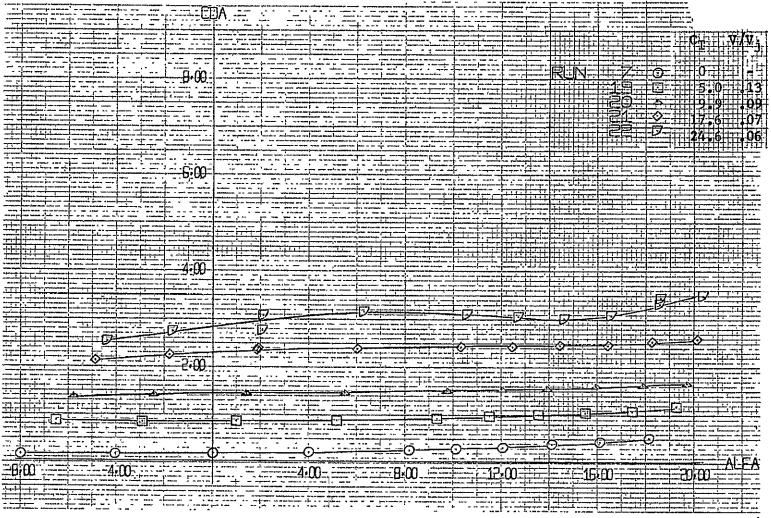


Figure A=8. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim$   $\delta_{\rm N}$  = 90°, Lateral Control In;  $T_{\rm R}/T_{\rm L}$  = .8 (Continued)

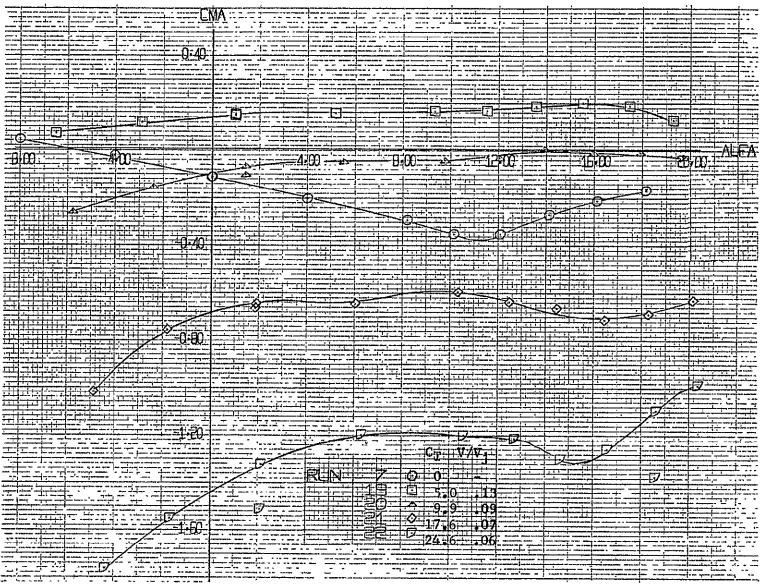


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N} = 90^{\circ}$ , Lateral Control In;  $T_{\rm R}/T_{\rm L} = ^{\circ}.8$  (Continued)

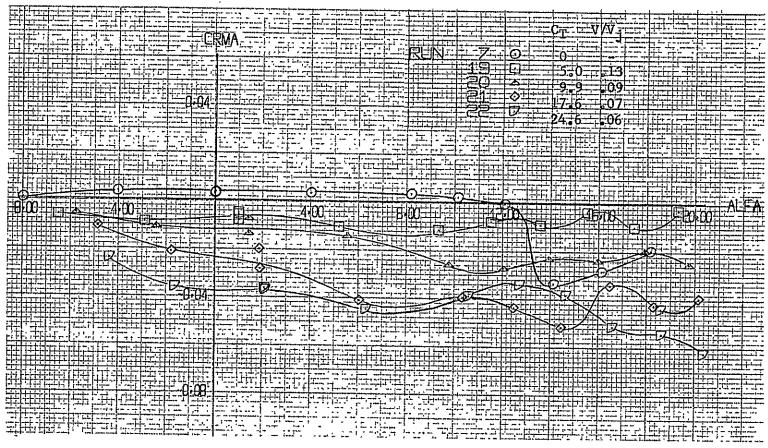
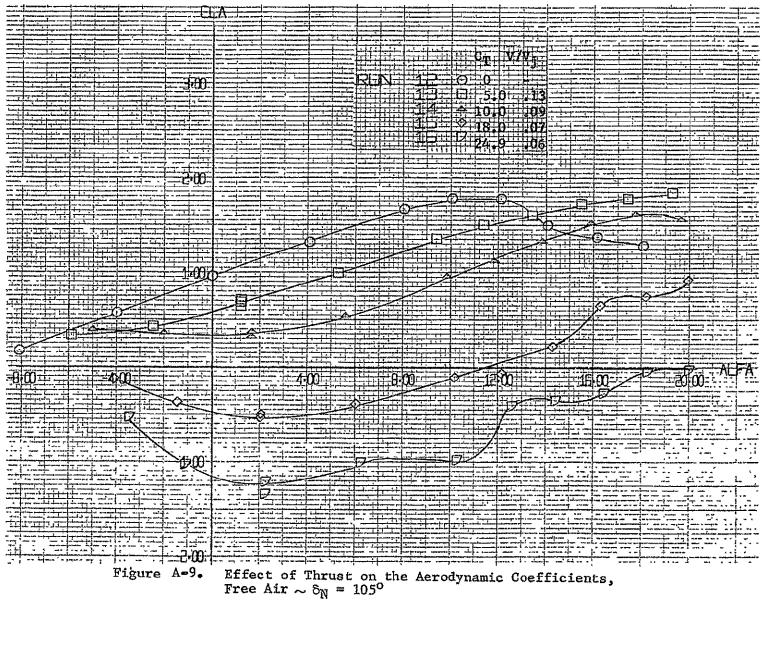


Figure A-8. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  = 90°, Lateral Control In;  $T_{\rm R}/T_{\rm L}$  = .8 (Concluded)



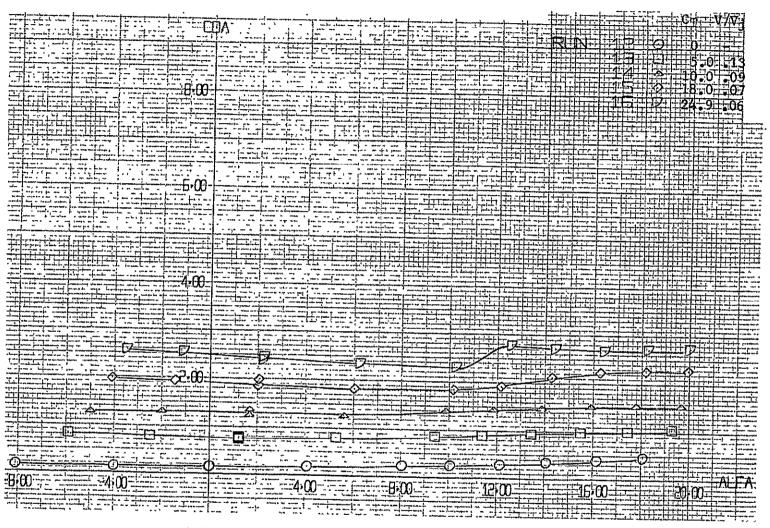


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  =  $105^{\rm o}$  (Continued)

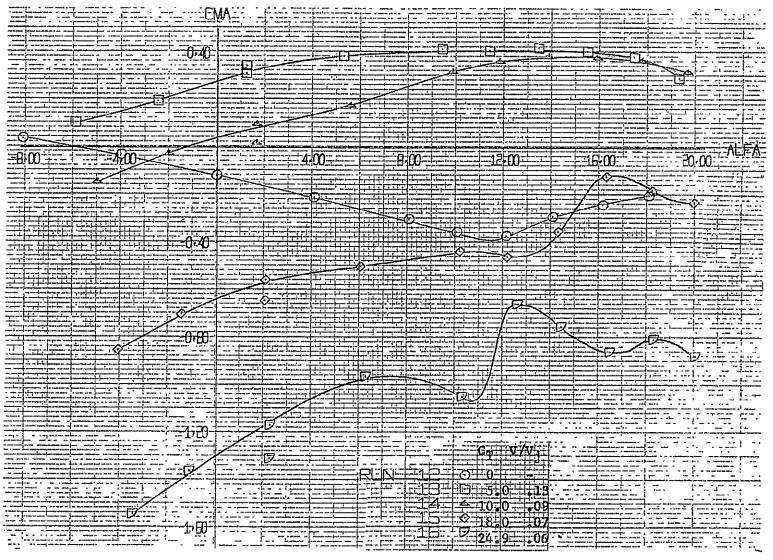


Figure A=9. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  =  $105^{\rm O}$  (Continued)

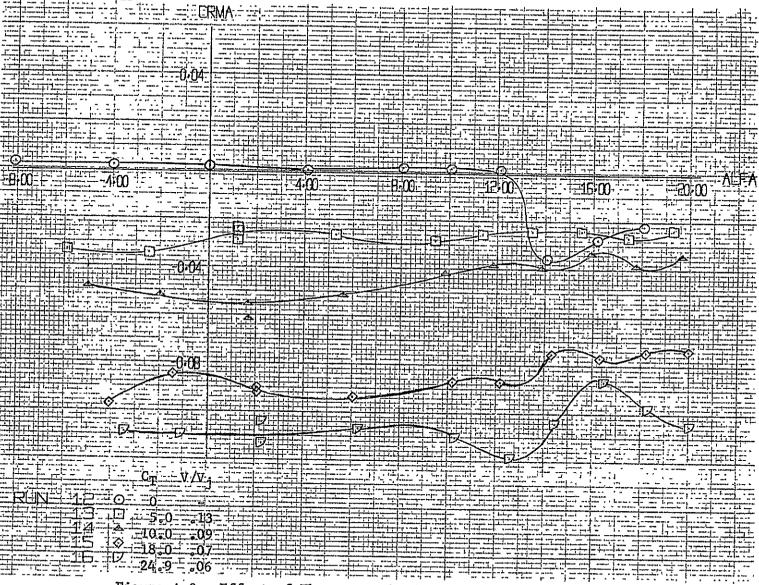


Figure A-9. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N} = 105^{\rm o}$  (Concluded)

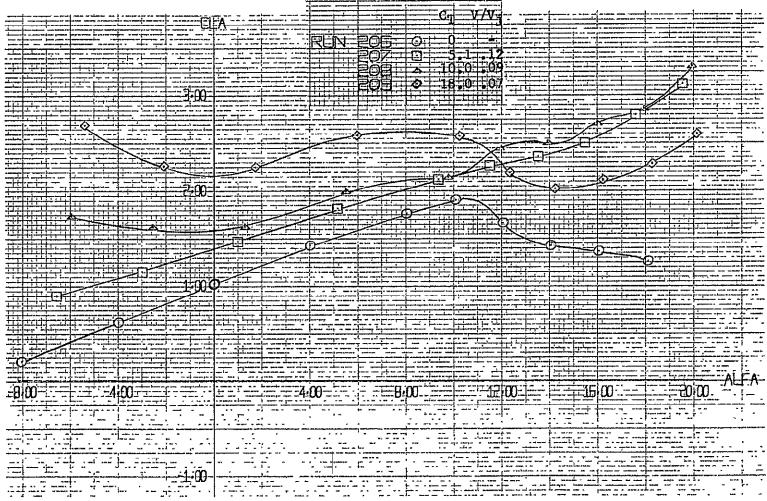


Figure A=10. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim$   $\delta_{\rm N}$  = 80°, 90°, 90°

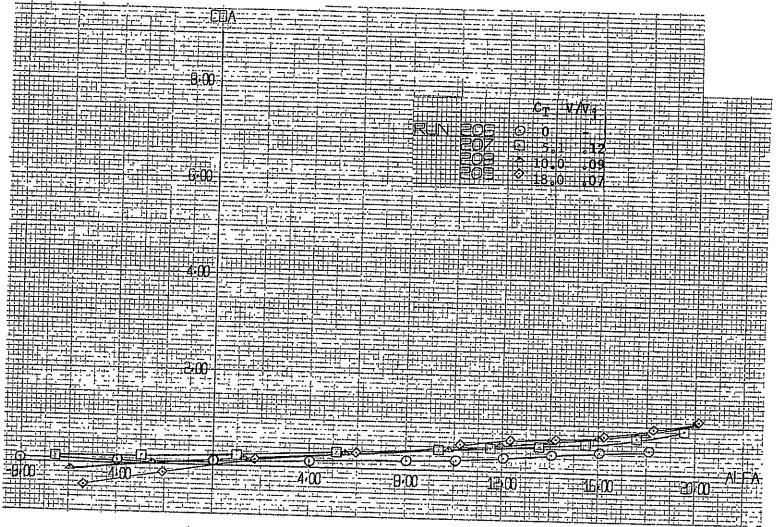


Figure A=10. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N}$  = 80°, 90°, 90° (Continued)

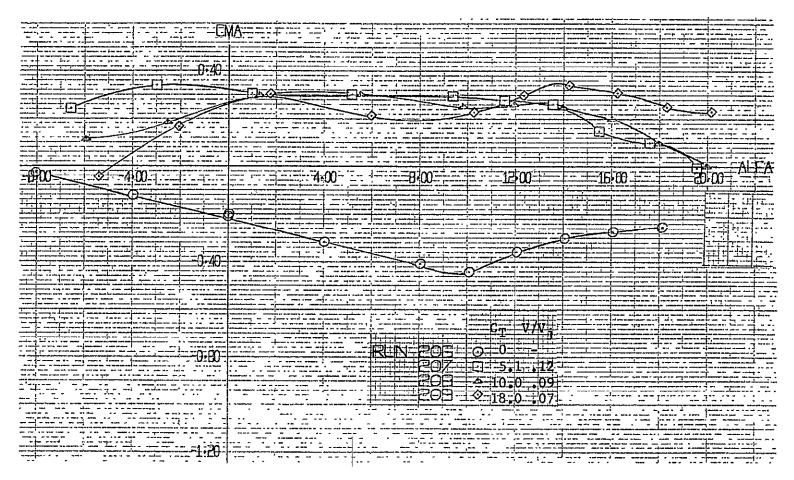


Figure A-10. Effect of Thrust on Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N} = 80^{\rm o}$ ,  $90^{\rm o}$ ,  $90^{\rm o}$  (Continued)

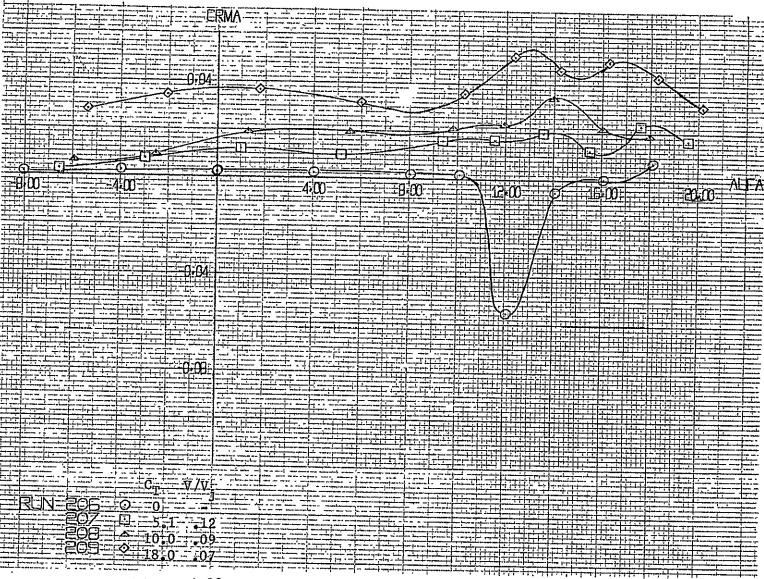


Figure A-10. Effect of Thrust on the Aerodynamic Coefficients, Free Air  $\sim \delta_{\rm N} = 80^{\rm o}$ , 90°, 90° (Concluded)

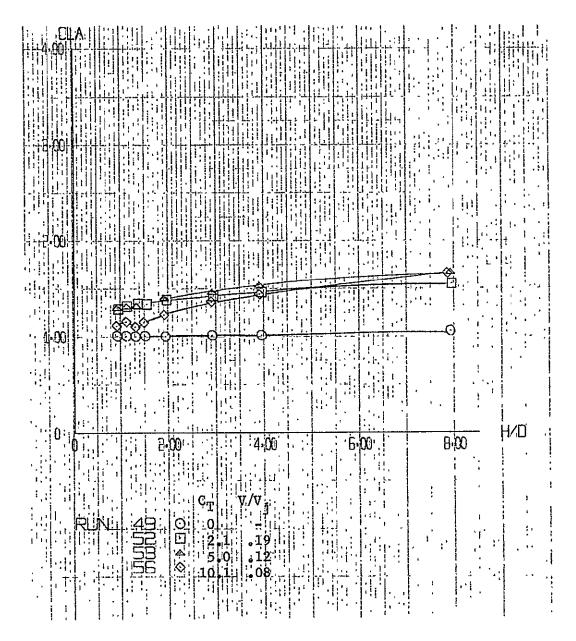
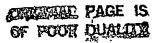


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{NFwd}$  = 30°,  $\delta_{NAft}$  = 60°;  $\alpha$  = 0°;  $\beta$  = 0°



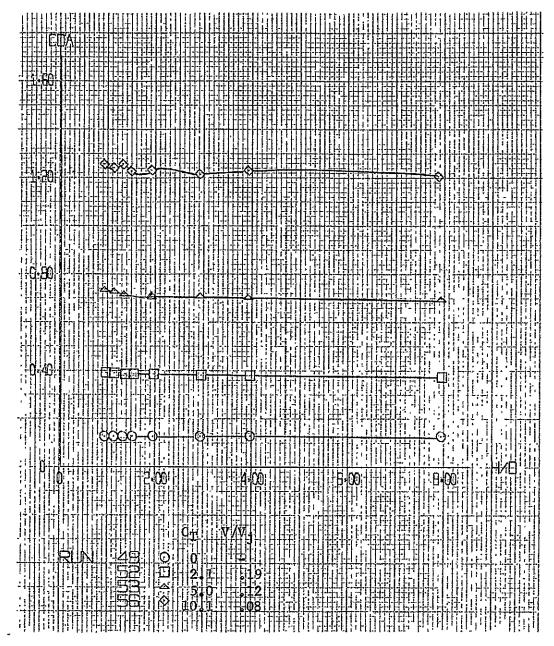


Figure A=11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{N_{Fwd}} = 30^{\circ}$ ,  $\delta_{N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

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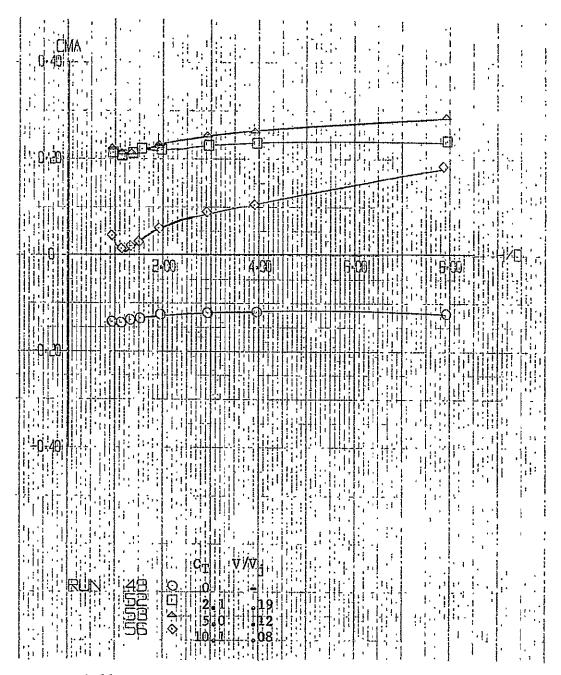


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0° (Continued)

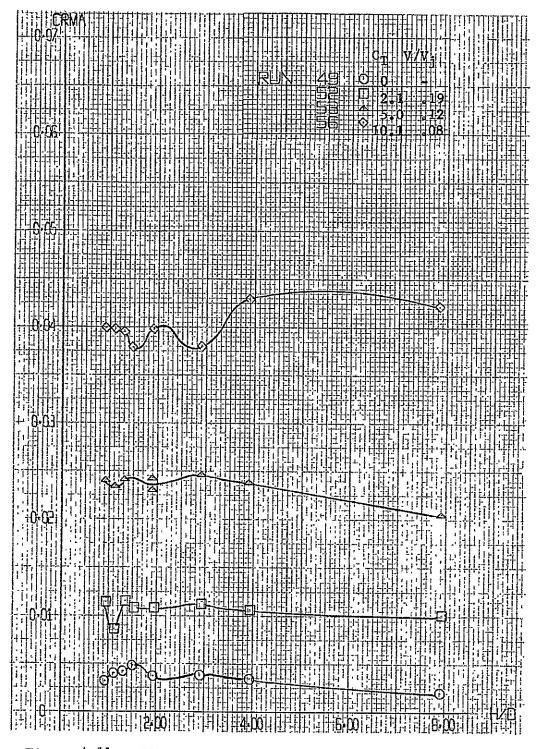


Figure A-11. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Concluded)

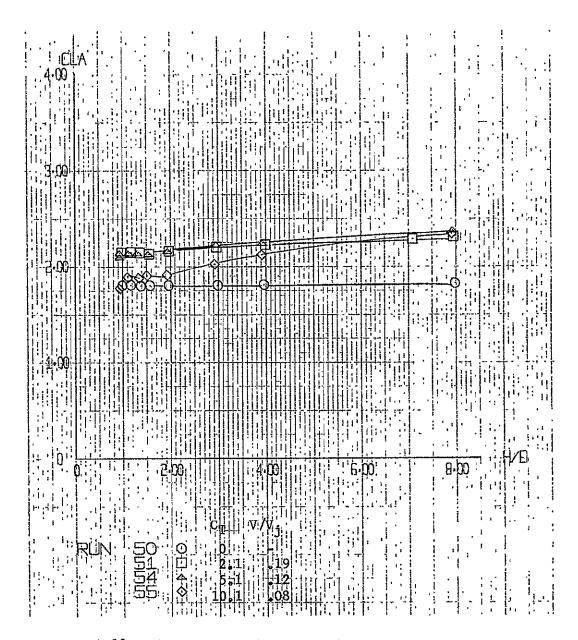


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 8°, Ø = 0°



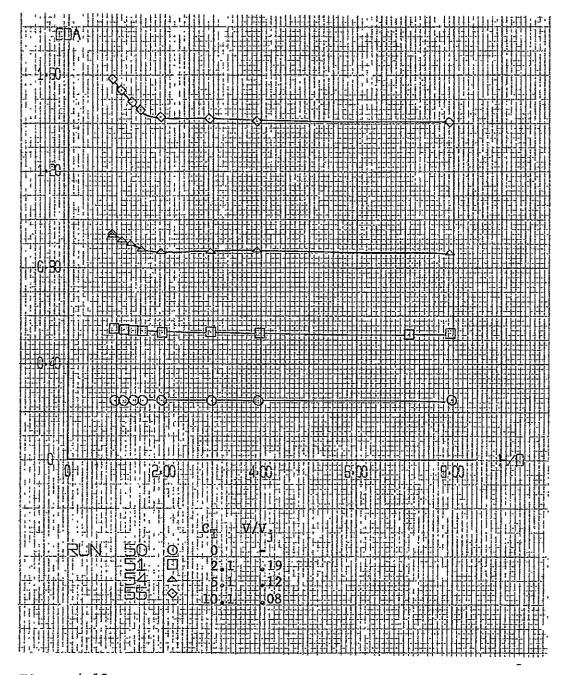


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

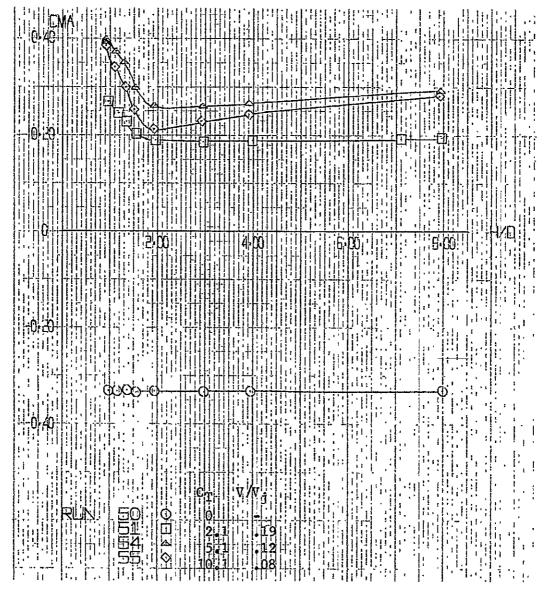


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

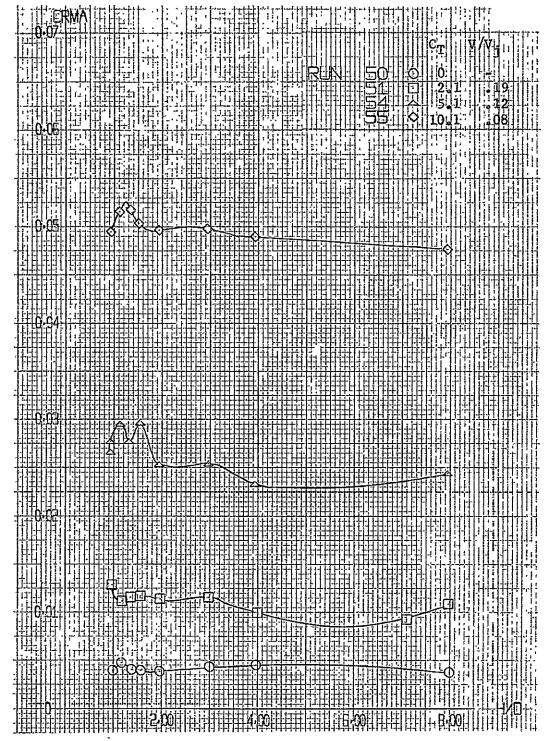
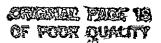


Figure A-12. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{N_{Fwd}}$  = 30°,  $\delta_{N_{Aft}}$  = 60°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Concluded)



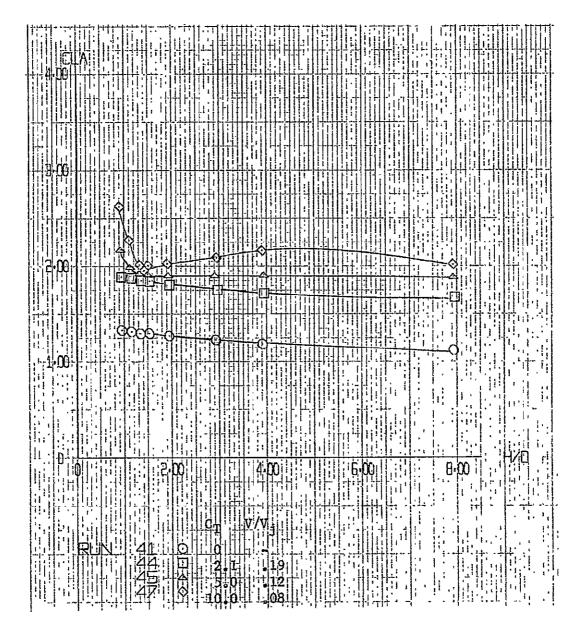


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\text{N}\,\text{Fwd}}$  = 30°,  $\delta_{\text{N}\,\text{Aft}}$  = 60°;  $\alpha$  = 0°

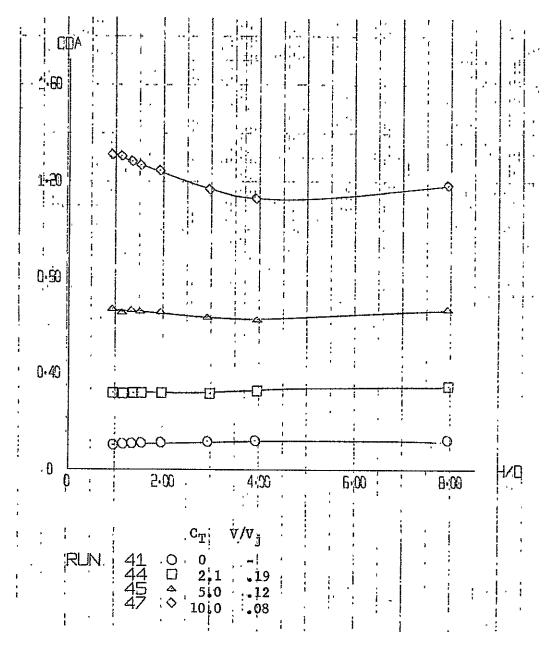


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\beta$  = 0° (Continued)

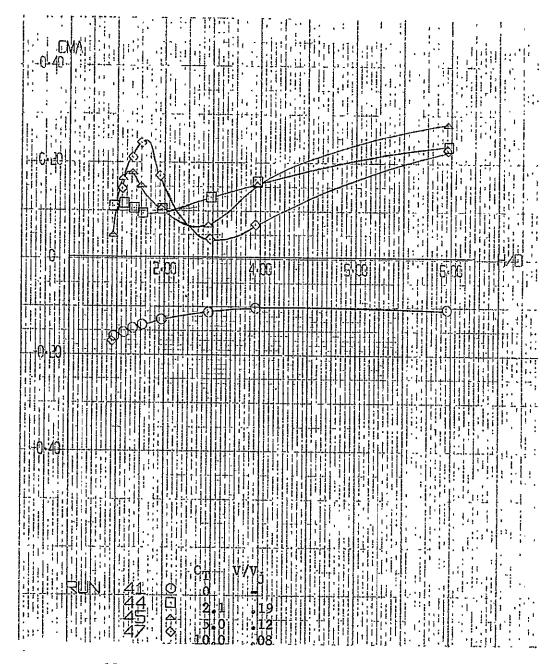


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N\,Fwd}=30^{\circ}$ ,  $\delta_{\rm N\,Aft}=60^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=0^{\circ}$  (Continued)

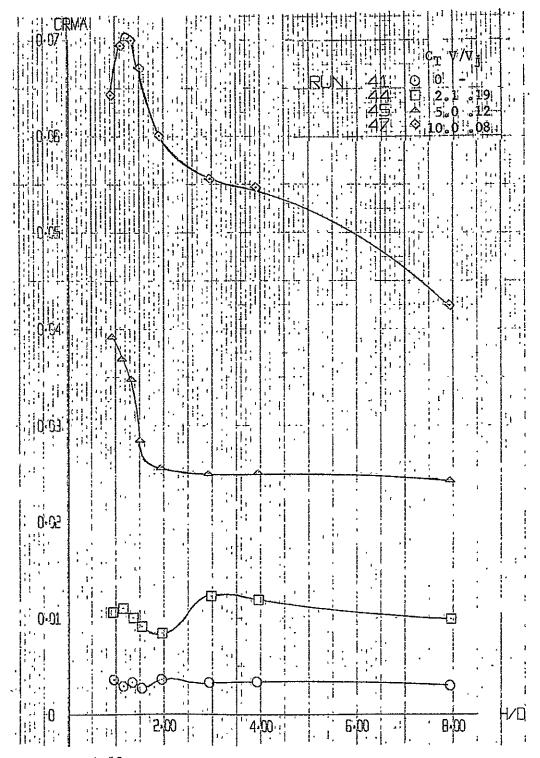


Figure A-13. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0° (Concluded)

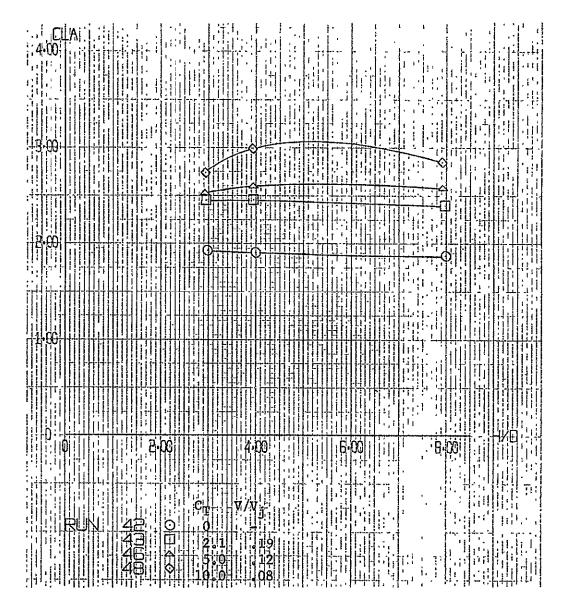


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 8°;  $\emptyset$  = 0°



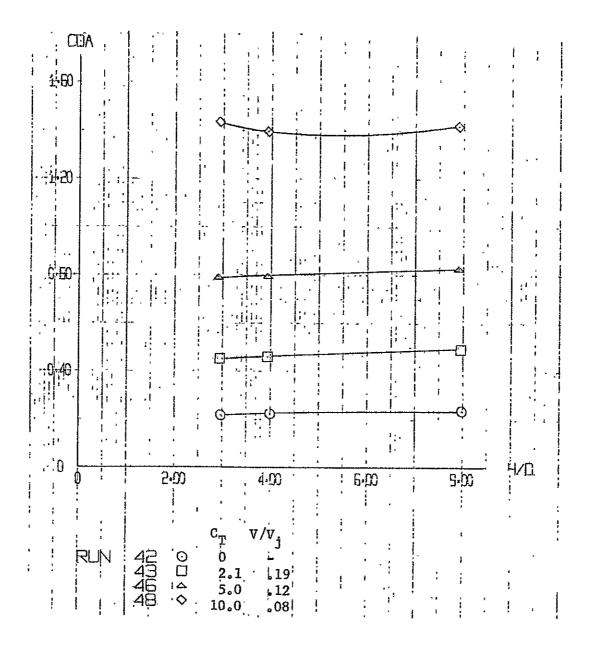


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

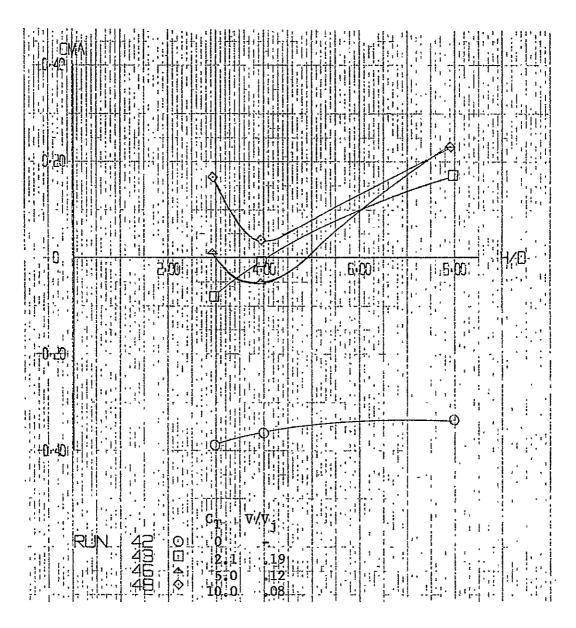


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

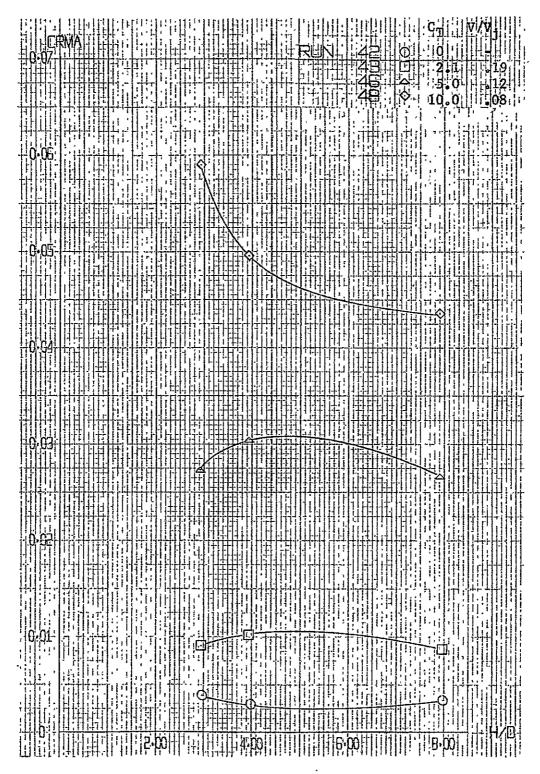


Figure A-14. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd} = 30^{\rm o}$ ,  $\delta_{\rm NAft} = 60^{\rm o}$ :  $\alpha = 8^{\rm o}$ :  $\emptyset = 0^{\rm o}$  (Concluded)

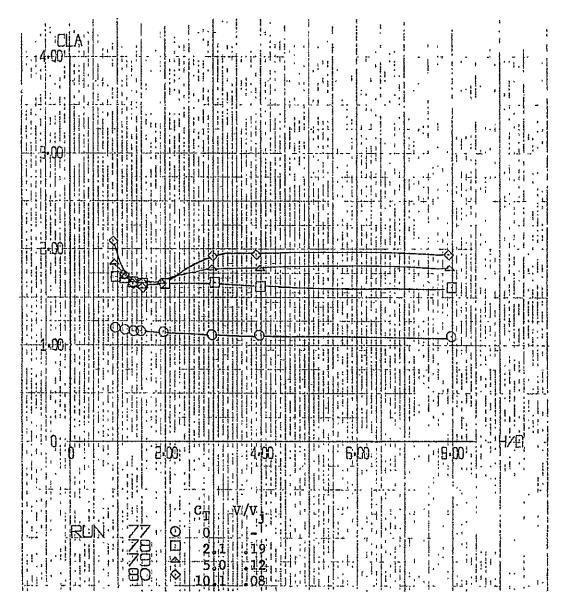
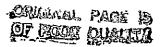


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0°



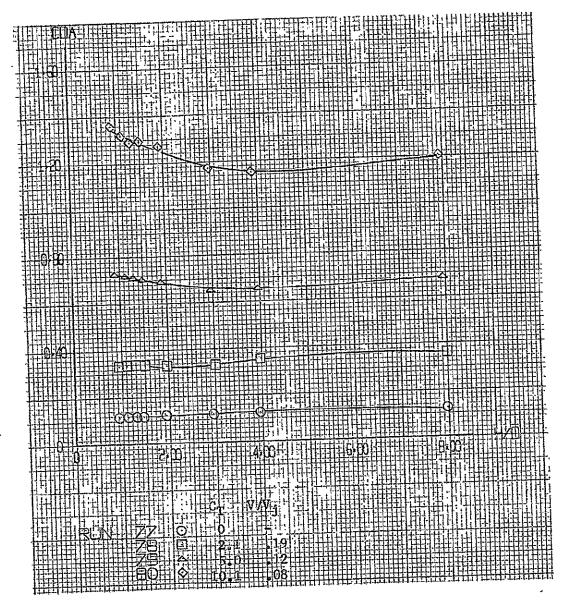


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd} = 30^{\rm o}$ ,  $\delta_{\rm NAft} = 60^{\rm o}$ ;  $\alpha = 0^{\rm o}$ ;  $\emptyset = 0^{\rm o}$  (Continued)

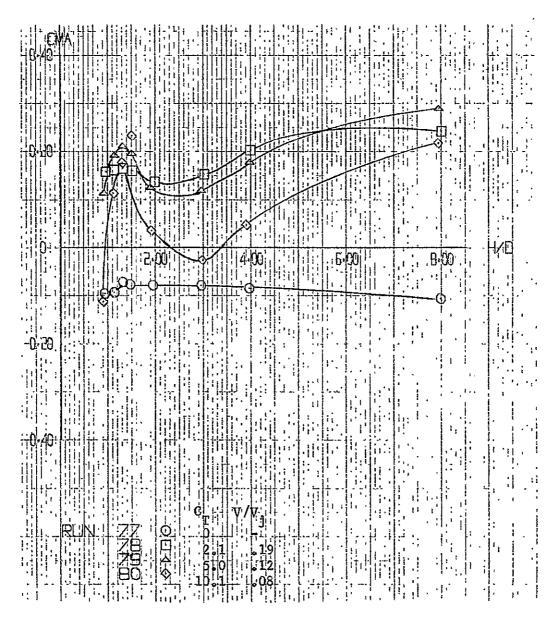


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\circ}$ ,  $\delta_{\rm NAft}=60^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=0^{\circ}$  (Continued)

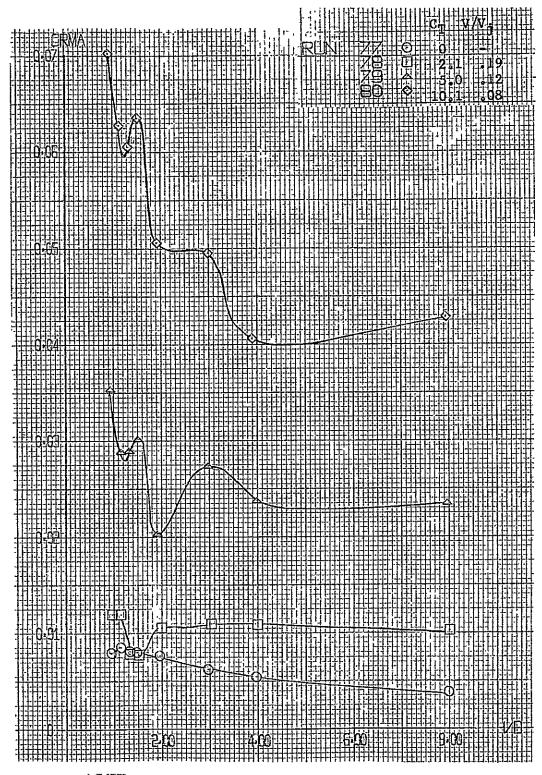


Figure A-15. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0° (Concluded)

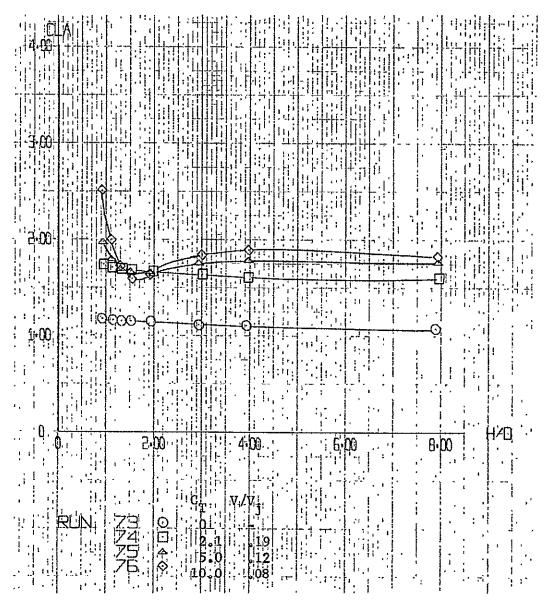


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 10°



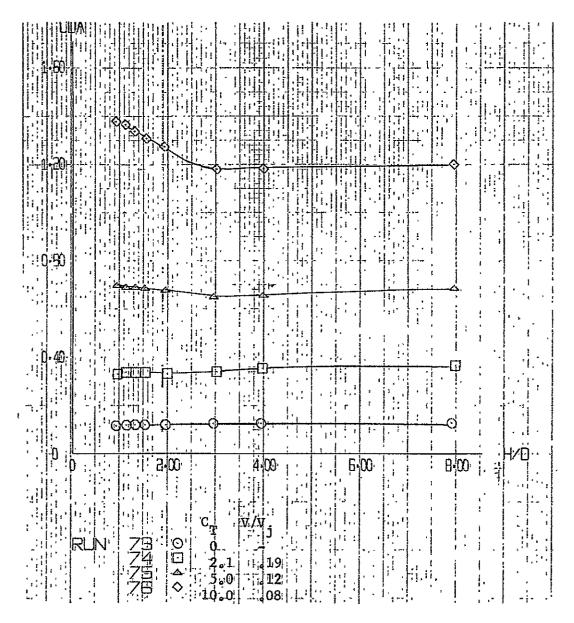


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\circ}$ ,  $\delta_{\rm NAft}=60^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\emptyset=10^{\circ}$  (Continued)



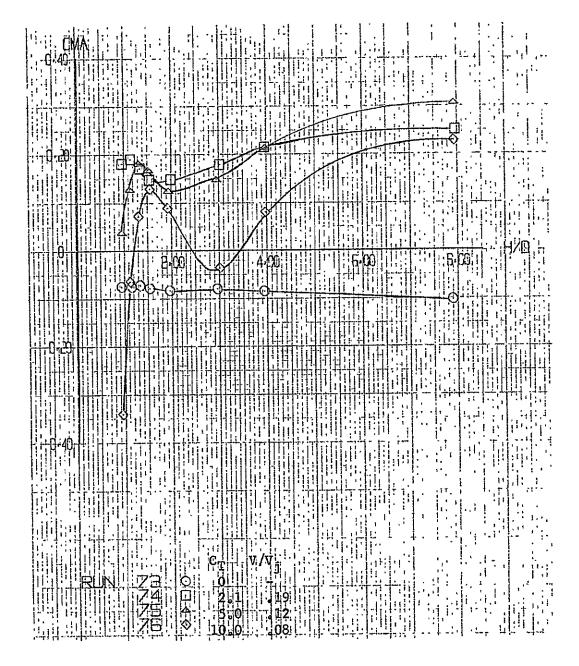


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

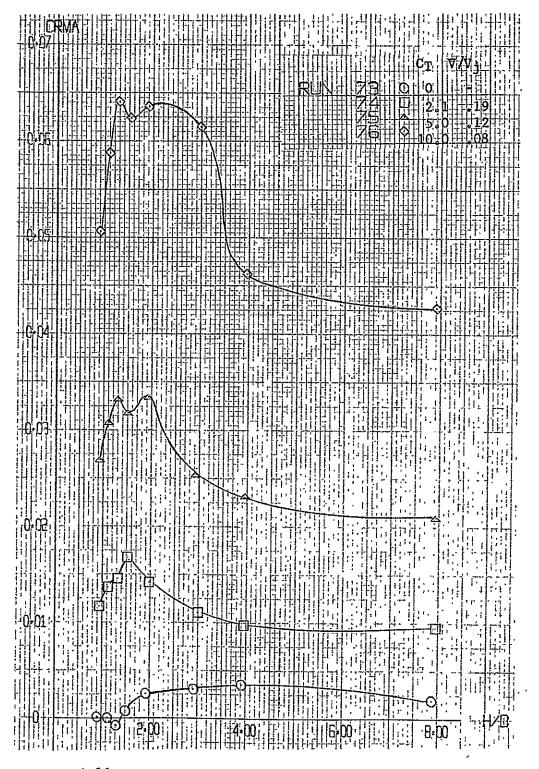


Figure A-16. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\rm o}$ ,  $\delta_{\rm NAft}=60^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\emptyset=10^{\rm o}$  (Concluded)

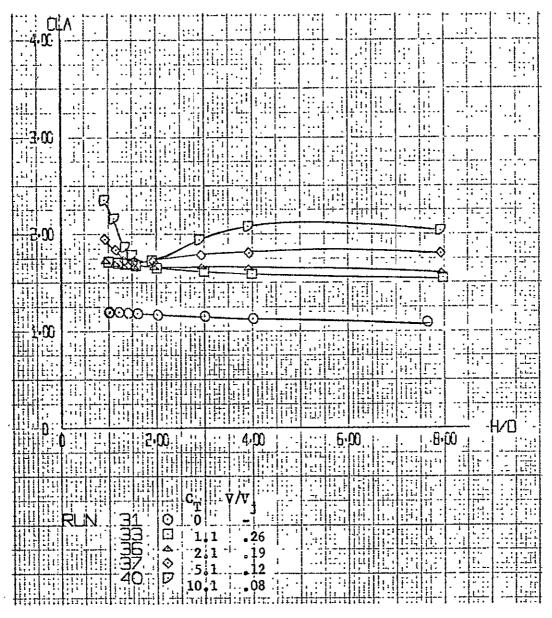


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\circ}$ ,  $\delta_{\rm N_{Aft}}=60^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\emptyset=0^{\circ}$ 

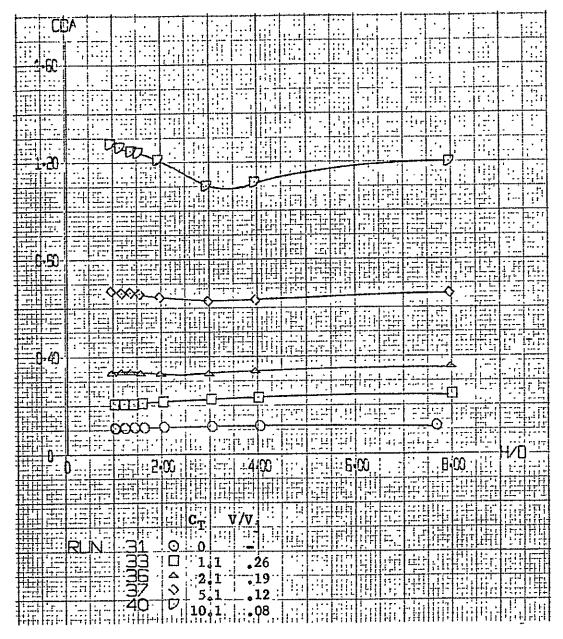


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N\,Fwd}=30^{\circ}$ ,  $\delta_{\rm N\,Aft}=60^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\emptyset=0^{\circ}$  (Continued)

## REPRODUCIBILITY OF THE ORIGINAL PAGE IS POOR

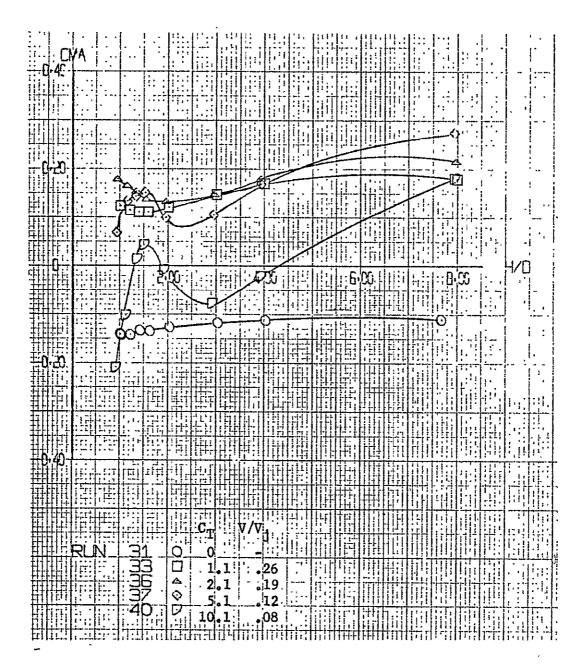


Figure A=17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{N_{Fwd}} = 30^{\circ}$ ,  $\delta_{N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\beta = 0^{\circ}$  (Continued)

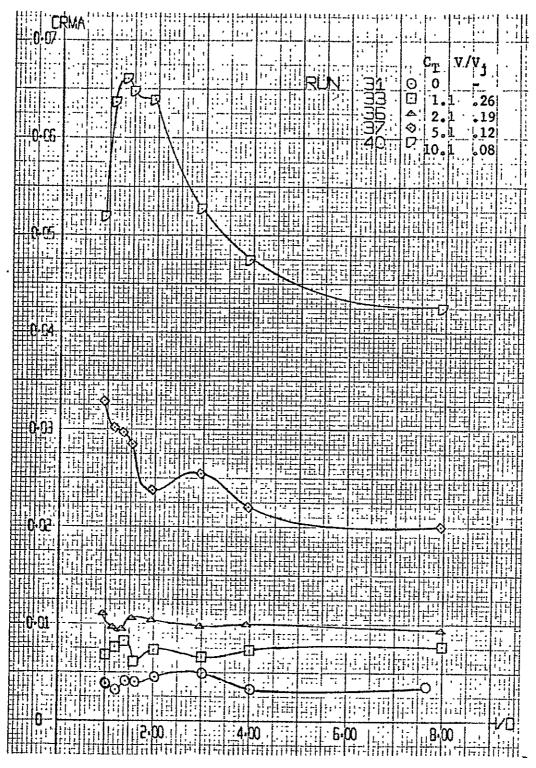


Figure A-17. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1;  $\delta_{N_{Fwd}} = 30^{\circ}$ ,  $\delta_{N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\beta = 0^{\circ}$  (Concluded)

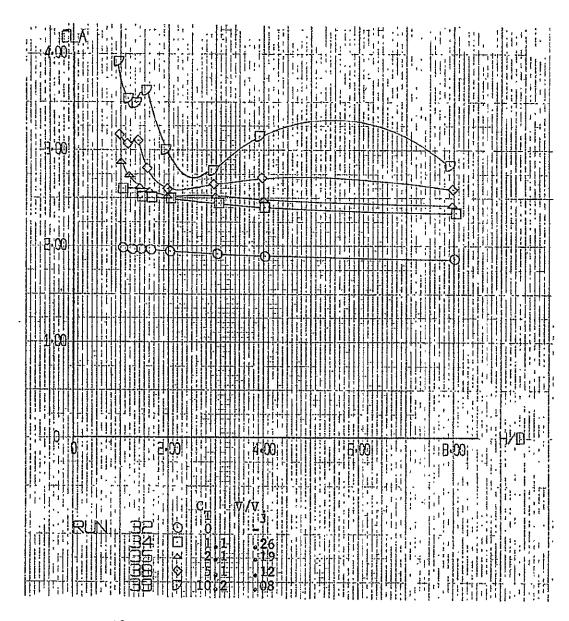


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 8°, Ø = 0°

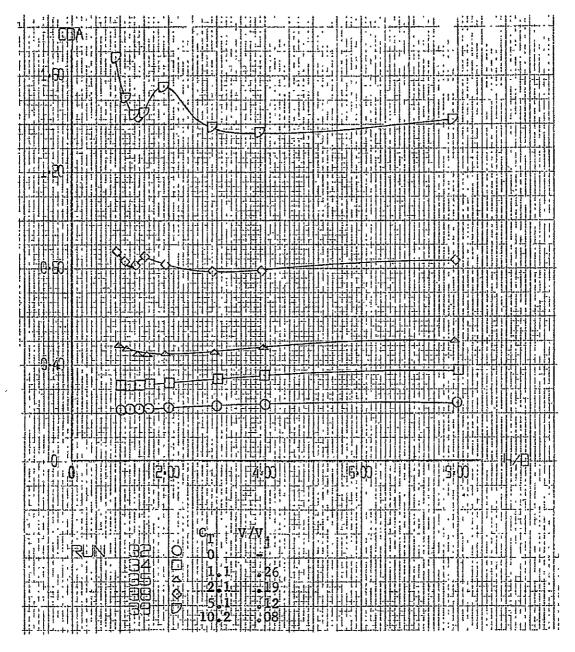
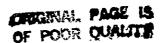


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\circ}$ ,  $\delta_{\rm NAft}=60^{\circ}$ ;  $\alpha=8^{\circ}$ ,  $\emptyset=0^{\circ}$  (Continued)



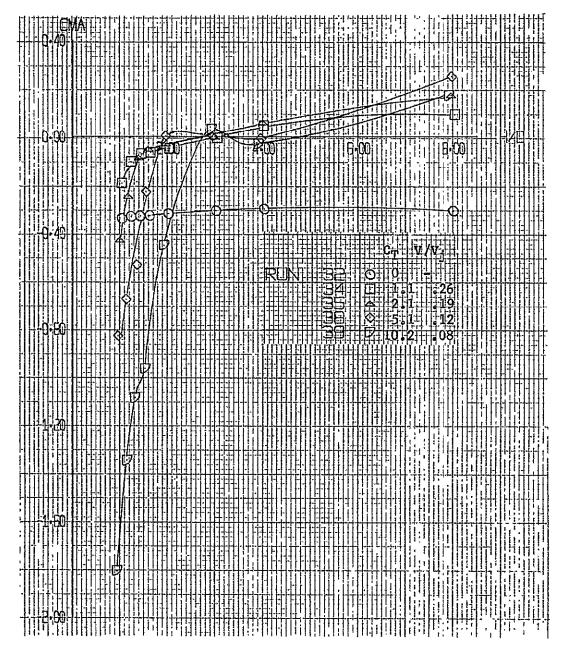


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{Fwd}} = 30^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 60^{\circ}$ ;  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

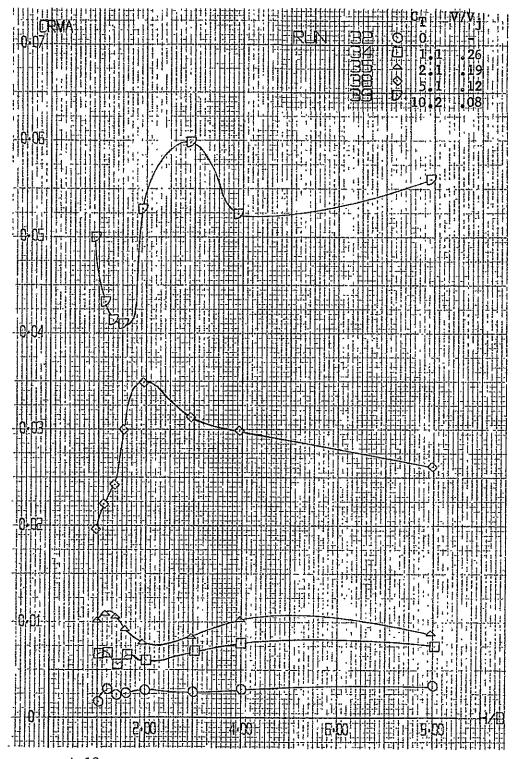


Figure A-18. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NFwd}=30^{\circ}$ ,  $\delta_{\rm NAft}=60^{\circ}$ ;  $\alpha=8^{\circ}$ ,  $\emptyset=0^{\circ}$  (Concluded)

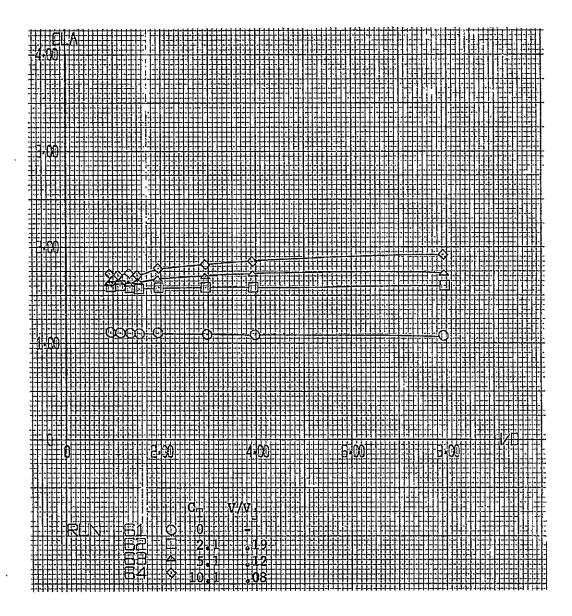


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuratio 5;  $\delta_{N_{Fwd}}$  = 30°,  $\delta_{N_{Aft}}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0°

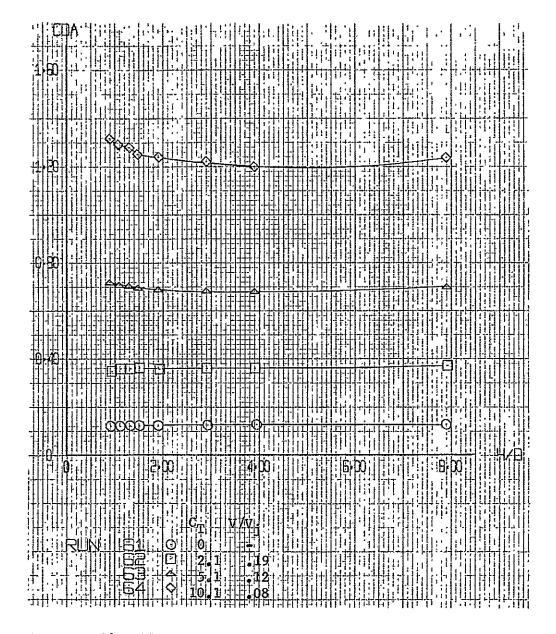


Figure A=19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{Fwd}} = 30^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

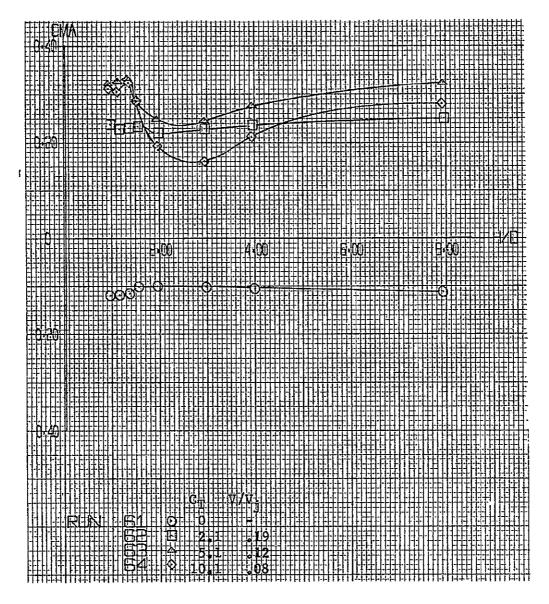


Figure A=19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 5;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\beta$  = 0° (Continued)

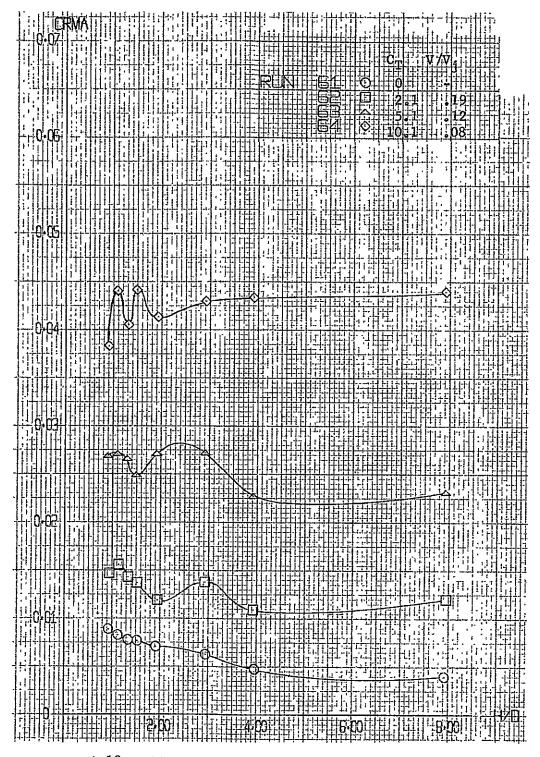


Figure A-19. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{N_{Fwd}}$  = 30°,  $\delta_{N_{Aft}}$  = 60°;  $\alpha$  = 0°;  $\beta$  = 0° (Concluded)

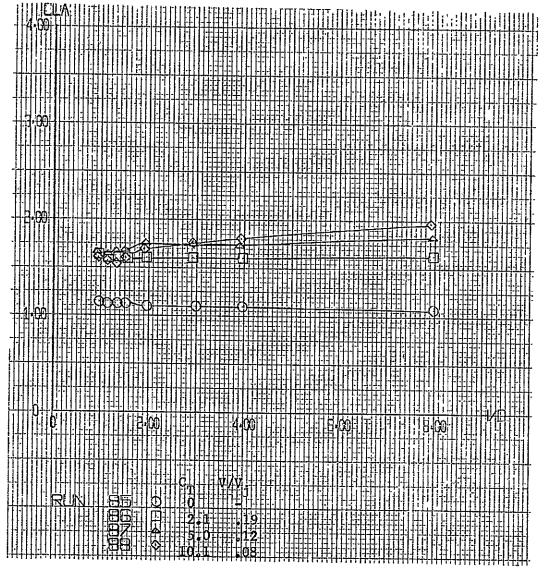


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{N_{Fwd}}$  = 30°,  $\delta_{N_{Aft}}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = -10°

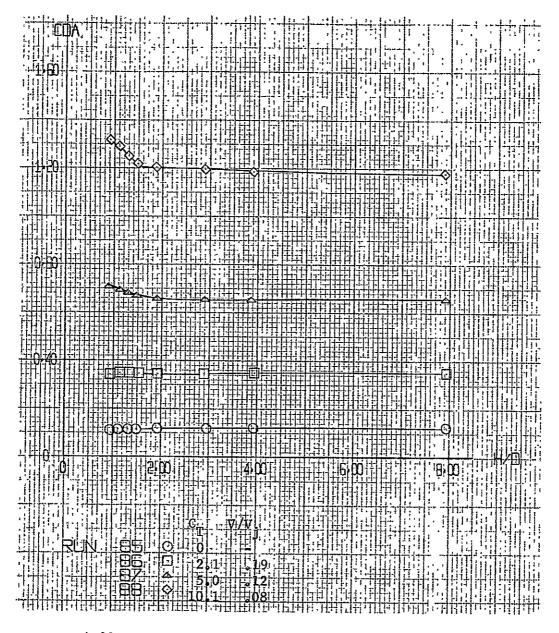


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

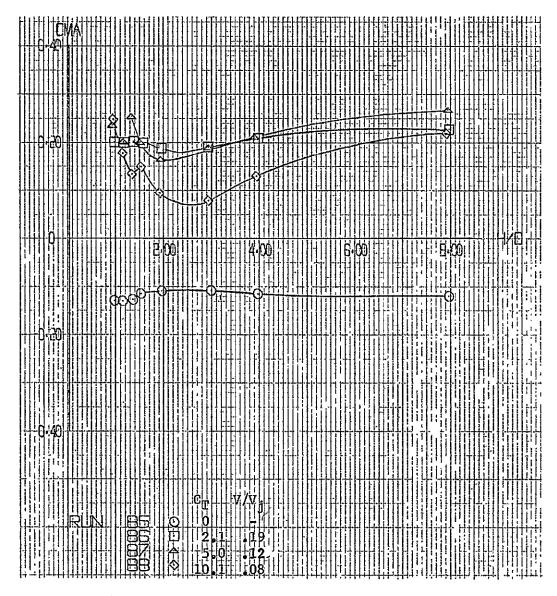


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{Fwd}} = 30^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\beta = -10^{\circ}$  (Continued)

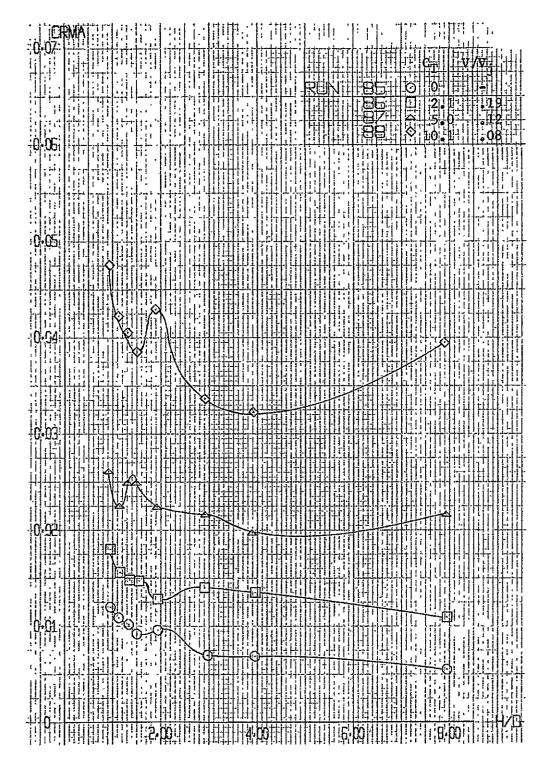
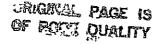


Figure A-20. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NFwd}$  = 30%,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Concluded)



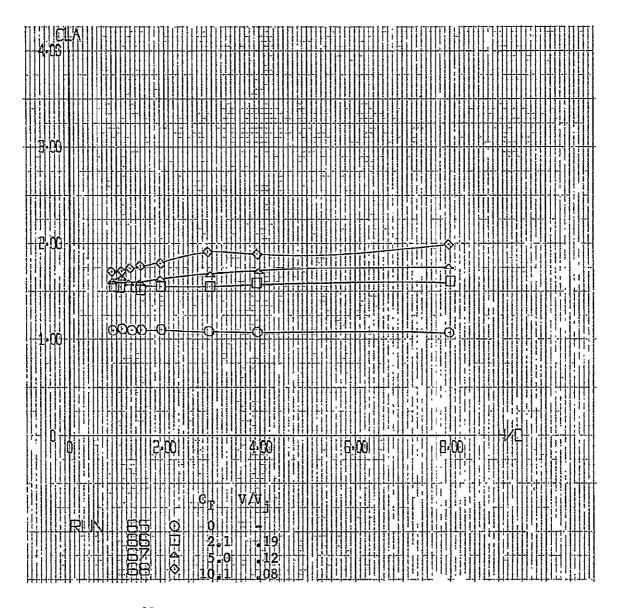


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{N\,Fwd}$  = 30°,  $\delta_{NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 10°

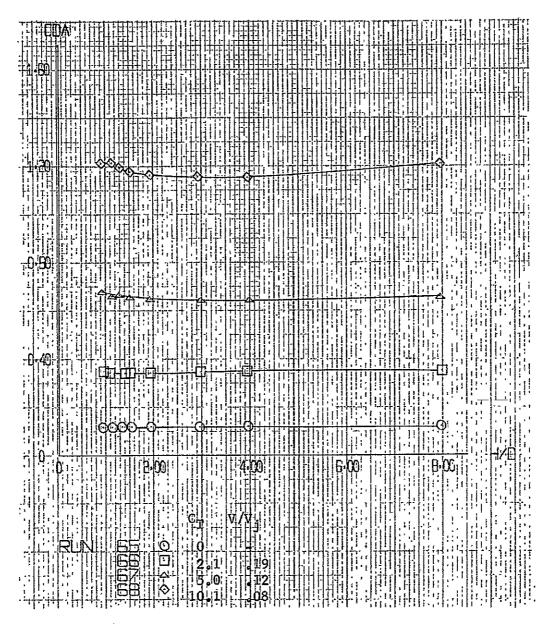


Figure A=21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 10^{\circ}$  (Continued)

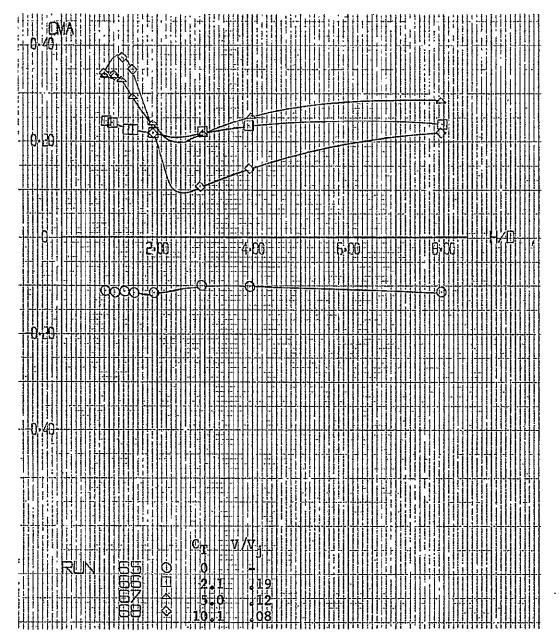


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 5;  $\delta N_{Fwd} = 30^{\circ}$ ,  $\delta N_{Aft} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 10^{\circ}$  (Continued)

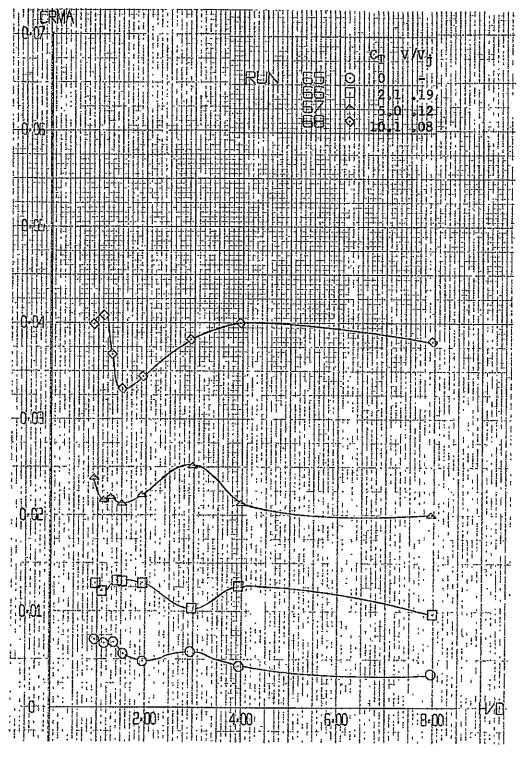


Figure A-21. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 10^{\circ}$  (Concluded)

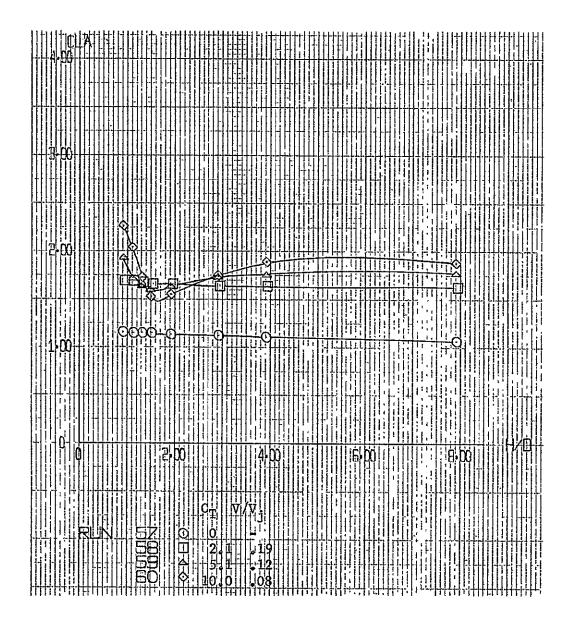


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0°

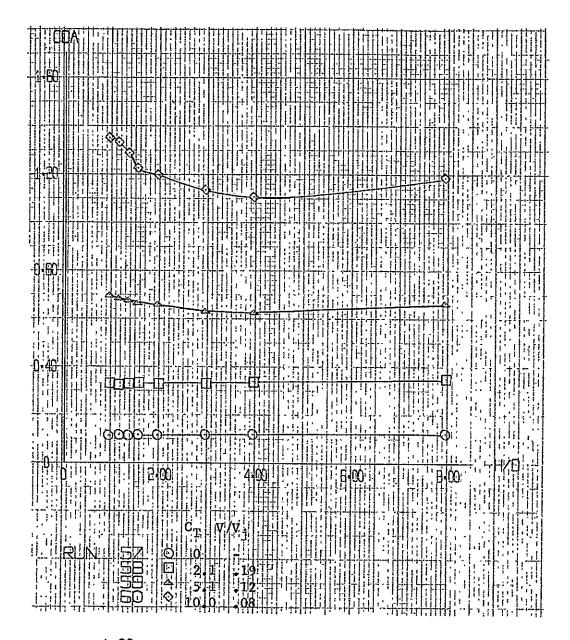


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0° (Continued)

C-2

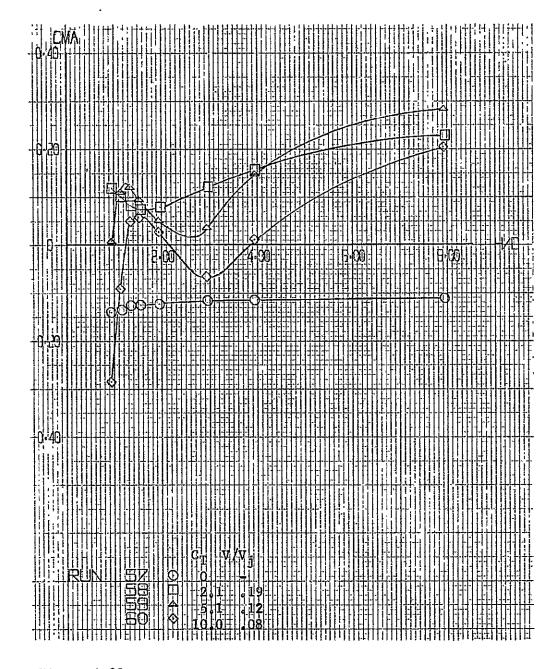


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0° (Continued)

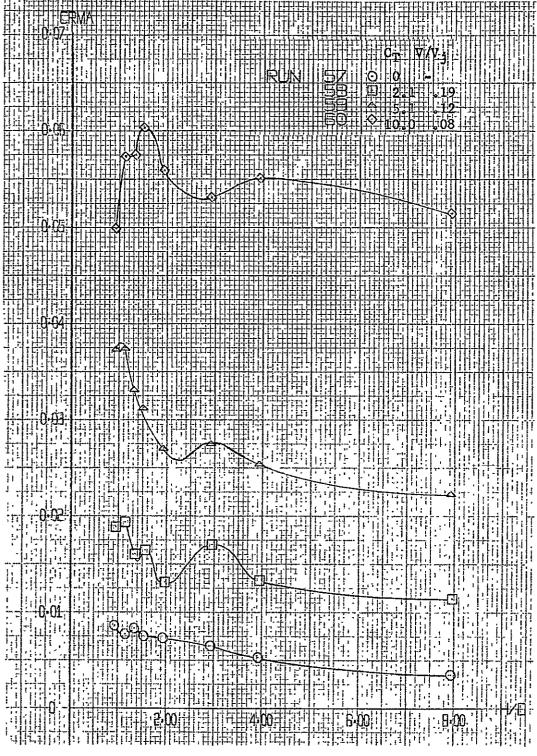


Figure A-22. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 0° (Concluded)

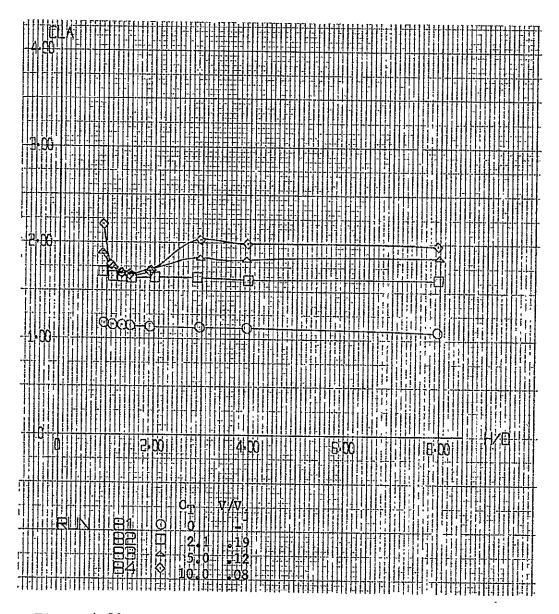


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\beta$  = -10°

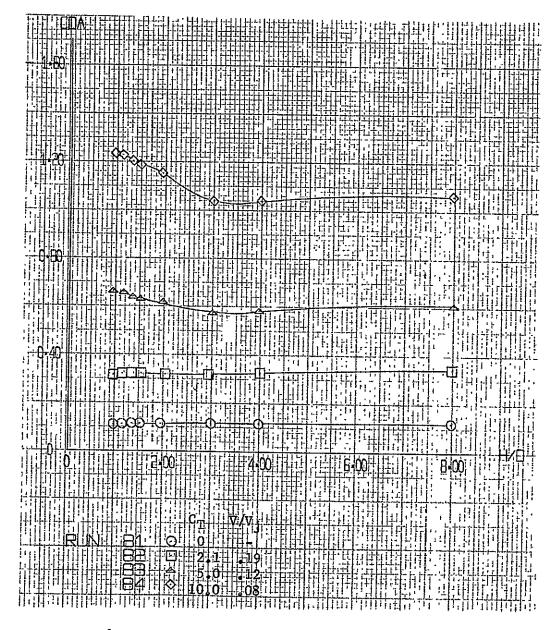
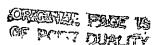


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NFwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)



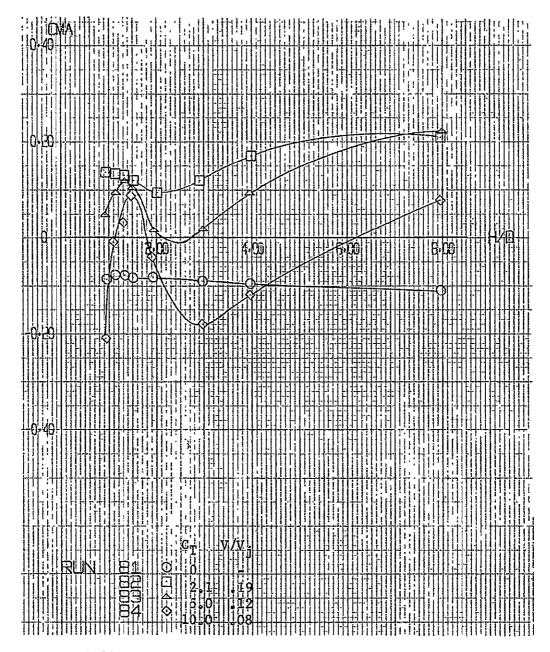


Figure A=23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NFwd} = 30^{\circ}$ ,  $\delta_{\rm NAft} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\beta = -10^{\circ}$  (Continued)

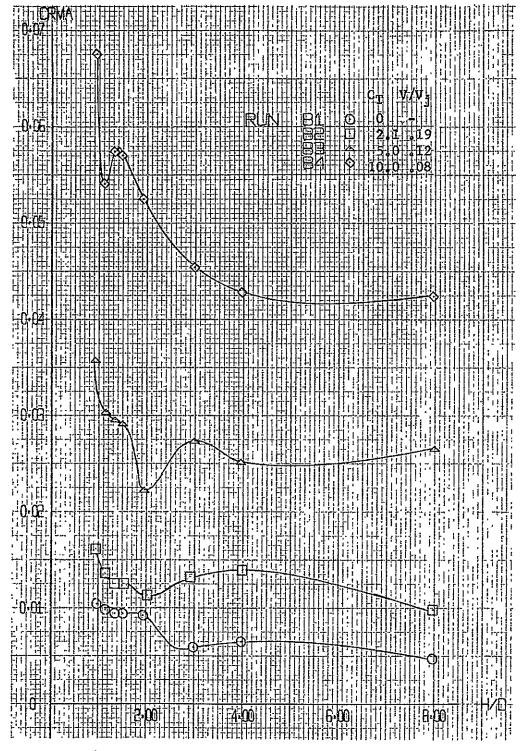


Figure A-23. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm NAft}$  = 60°;  $\alpha$  = 0°;  $\beta$  = -10° (Concluded)

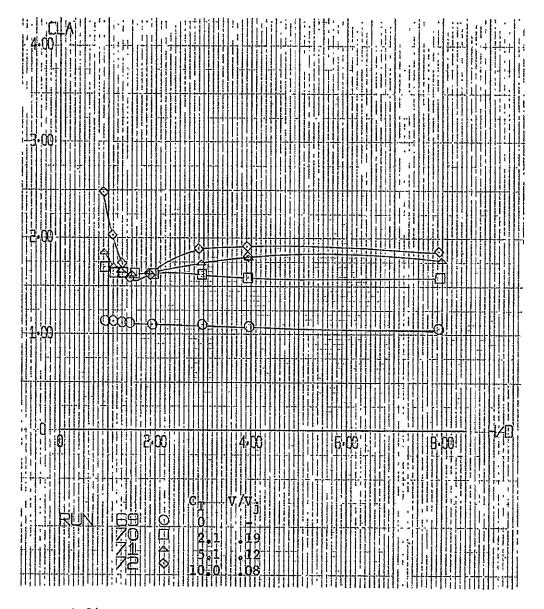
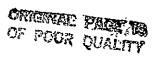


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N\,Fwd}$  = 30°,  $\delta_{\rm N\,Aft}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 10°



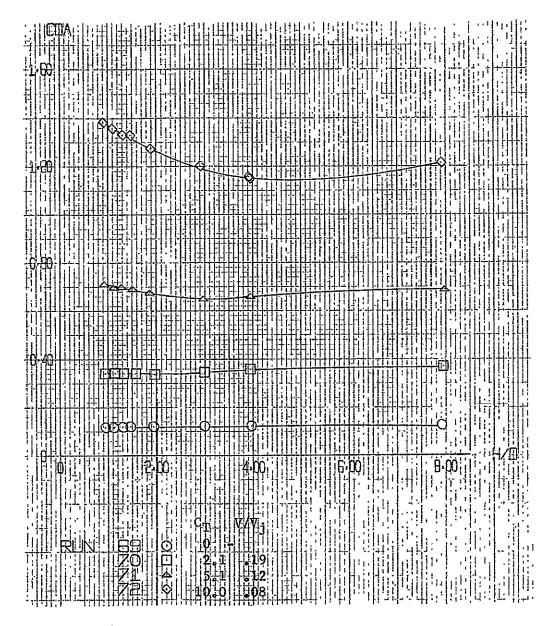


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{N_{Fwd}} = 30^{\circ}$ ,  $\delta_{N_{Aft}} = 60^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\emptyset = 10^{\circ}$  (Continued)

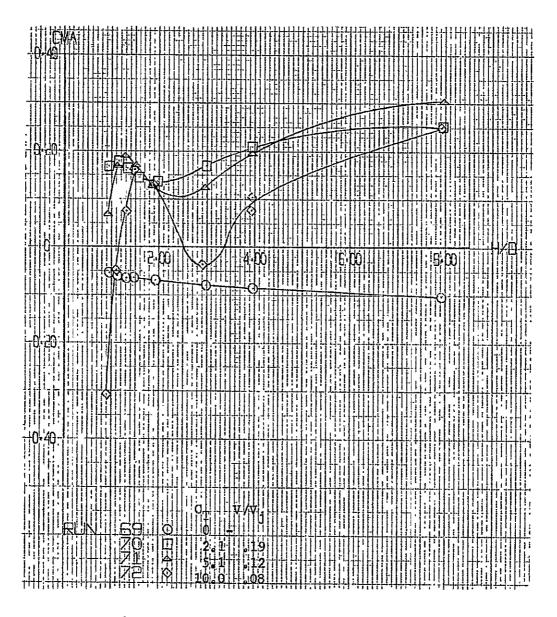


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{Fwd}}$  = 30°,  $\delta_{\rm N_{Aft}}$  = 60°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

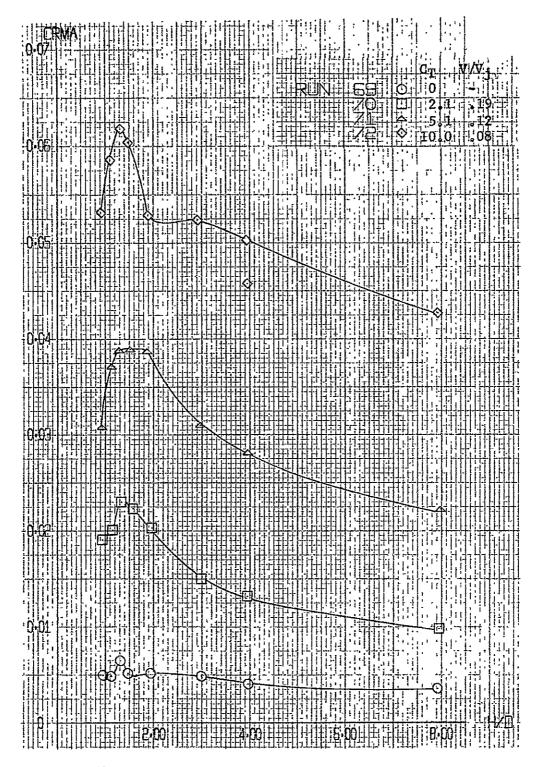


Figure A-24. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{Fwd}} = 30^{\rm o}$ ,  $\delta_{\rm N_{Aft}} = 60^{\rm o}$ ;  $\alpha = 0^{\rm o}$ ;  $\emptyset = 10^{\rm o}$  (Concluded)

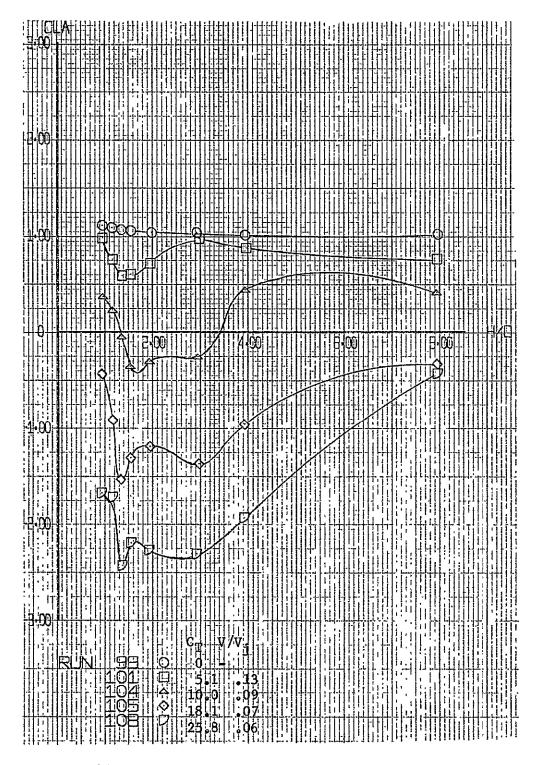


Figure A=25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°

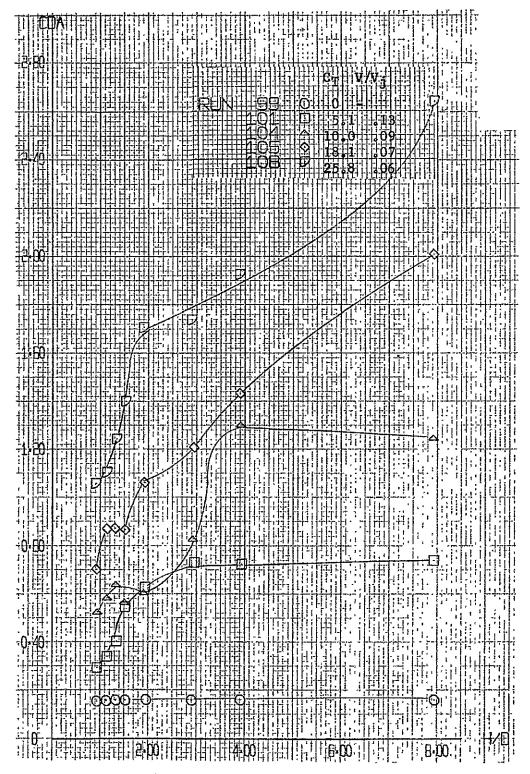


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\emptyset=0^{\rm o}$  (Continued)

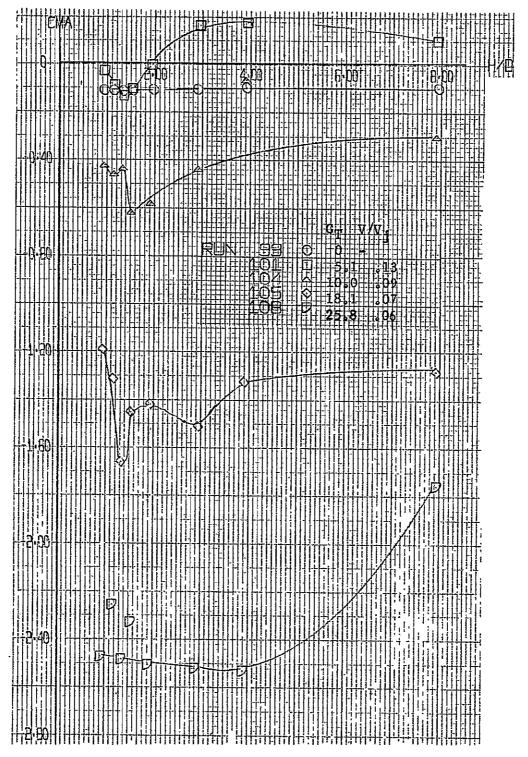


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=0^{\circ}$  (Continued)

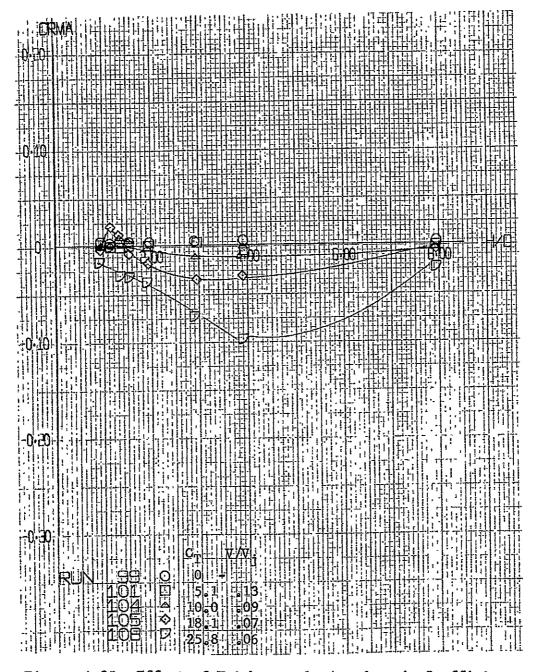


Figure A-25. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\beta=0^{\rm o}$  (Concluded)

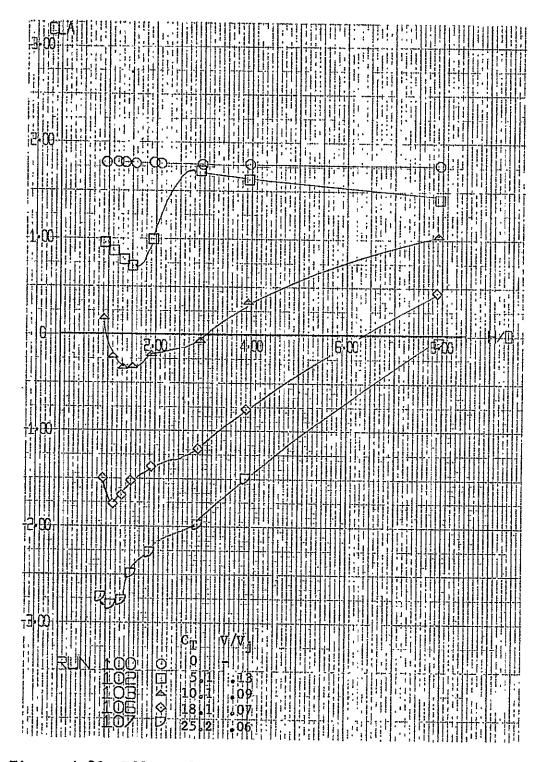


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\rm o};~\alpha=8^{\rm o};~\emptyset=0^{\rm o}$ 

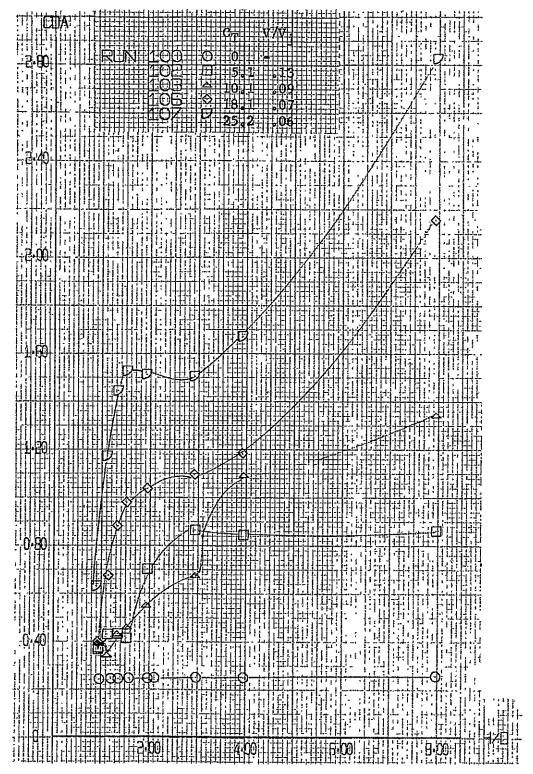


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\rm o};\;\alpha=8^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

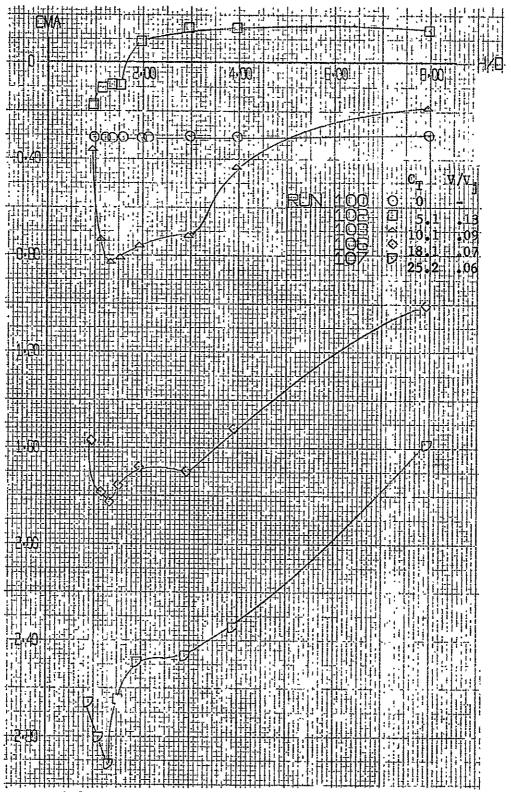


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_N = 90^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

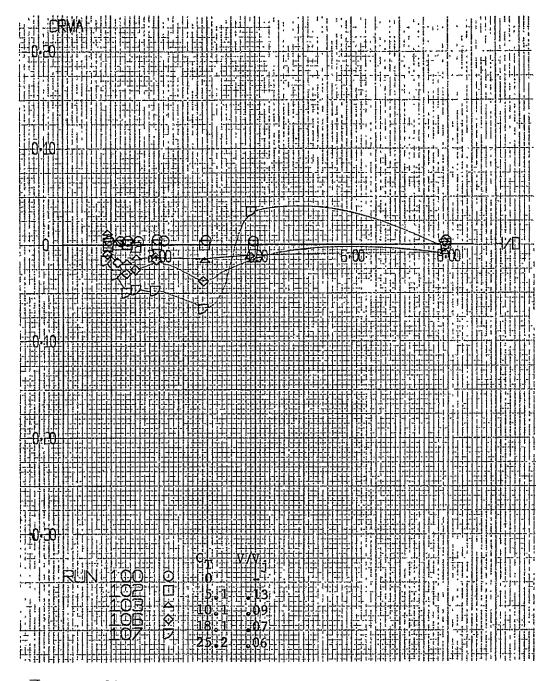


Figure A-26. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\circ}$ ;  $\alpha=8^{\circ}$ ;  $\emptyset=0^{\circ}$  (Concluded)

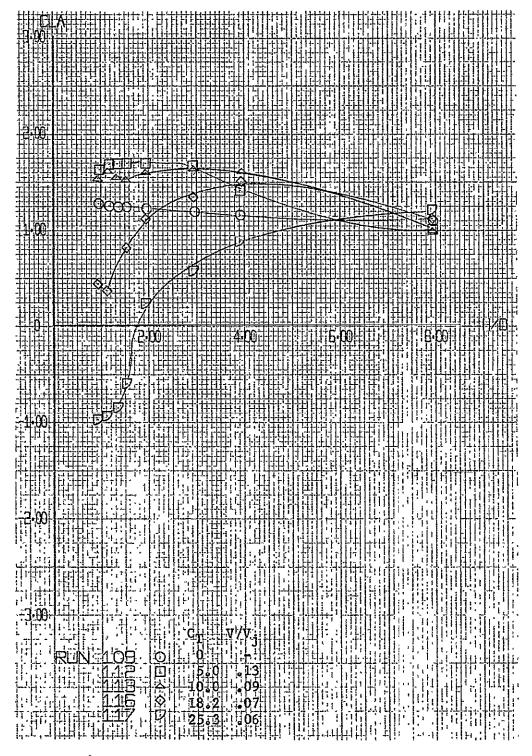


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}=90^{\rm o};~\alpha=0^{\rm o};~\emptyset=0^{\rm o}$ 

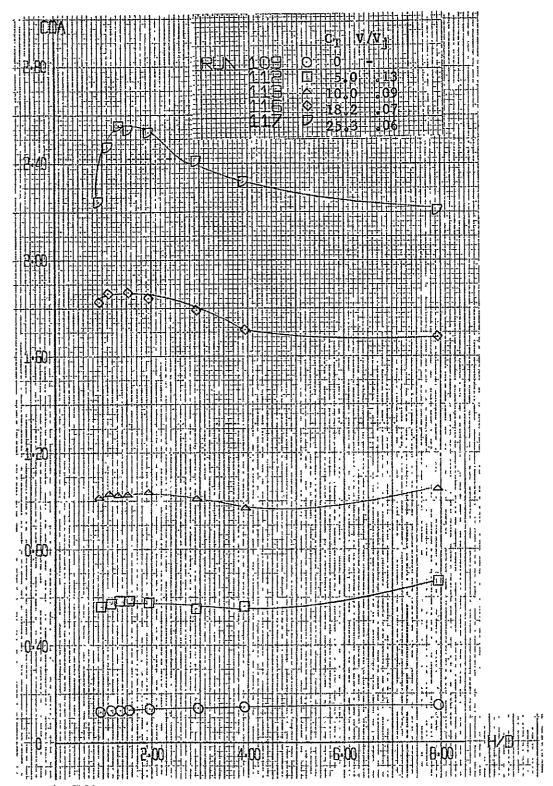
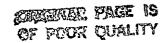


Figure A=27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}=90^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=0^{\circ}$  (Continued)



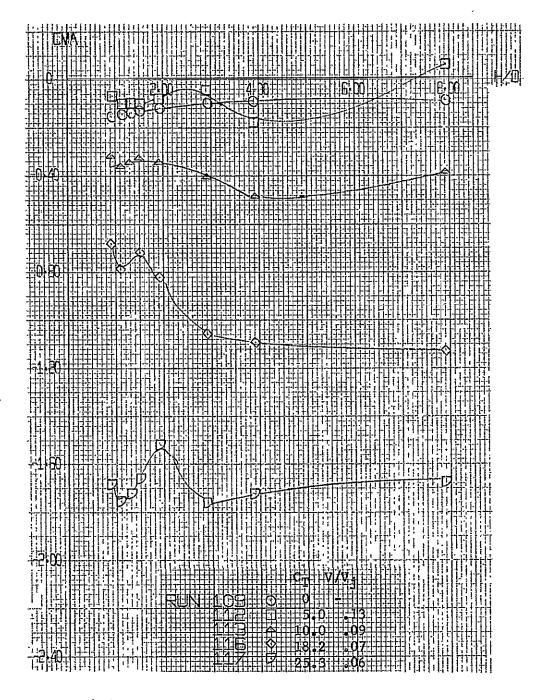


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0° (Continued)

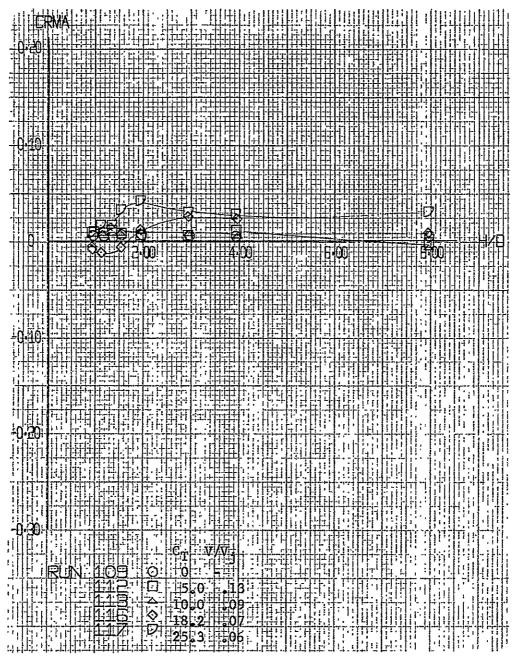


Figure A-27. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0° (Concluded)

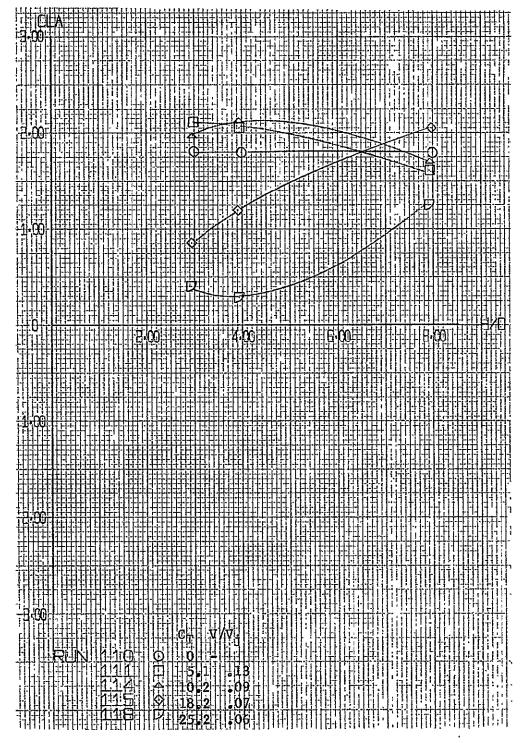


Figure Å-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_N=90^\circ;~\alpha=8^\circ;~\emptyset=0^\circ$ 

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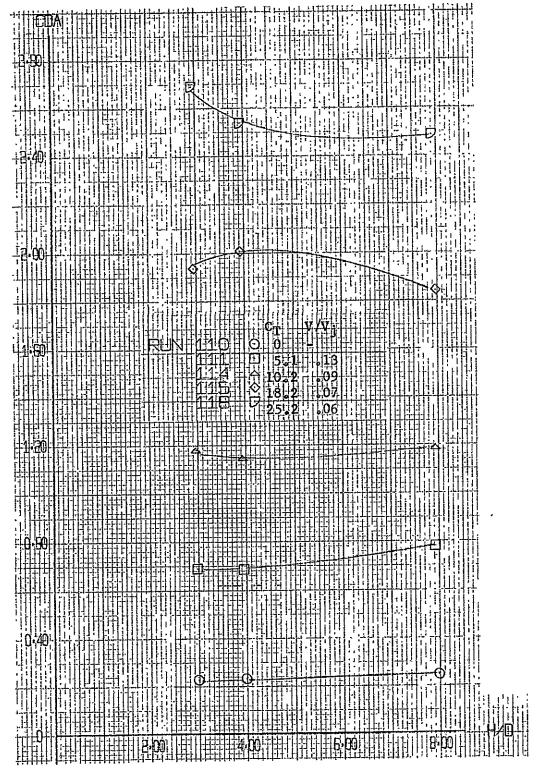


Figure A-28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_N = 90^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

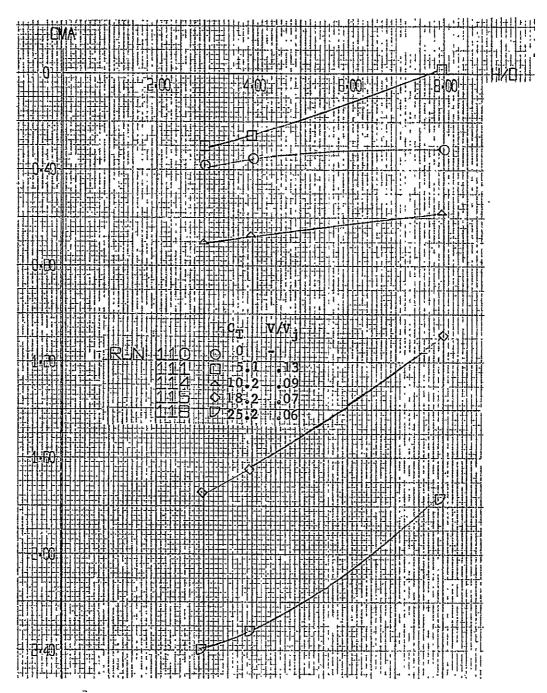


Figure A=28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

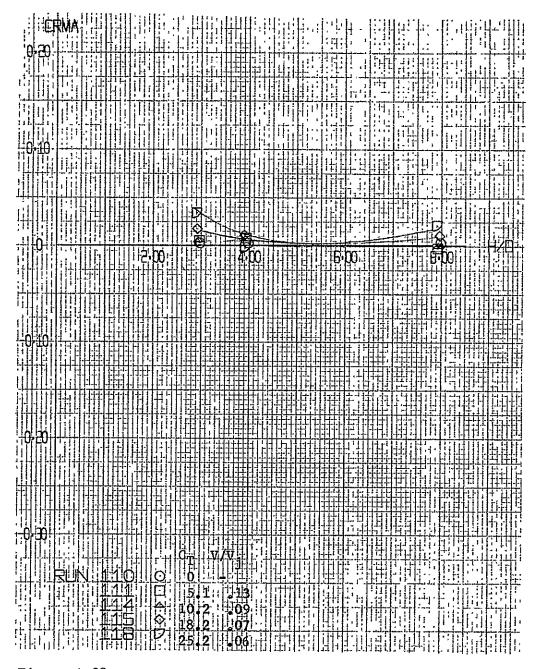


Figure A=28. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{N_i} = 90^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

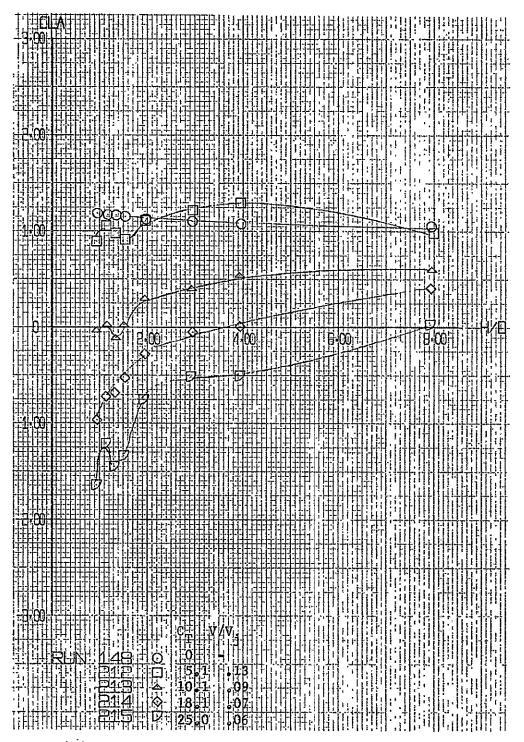


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\beta=-10^{\rm o}$ 

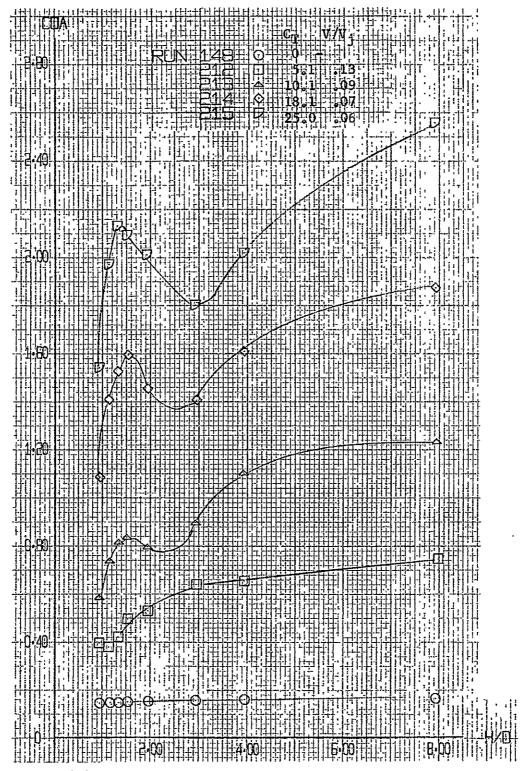


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

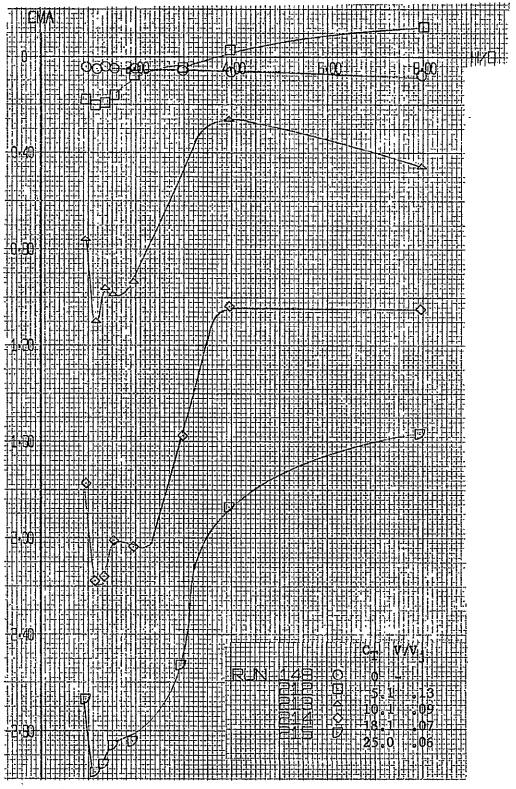


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=-10^{\rm o}$  (Continued)

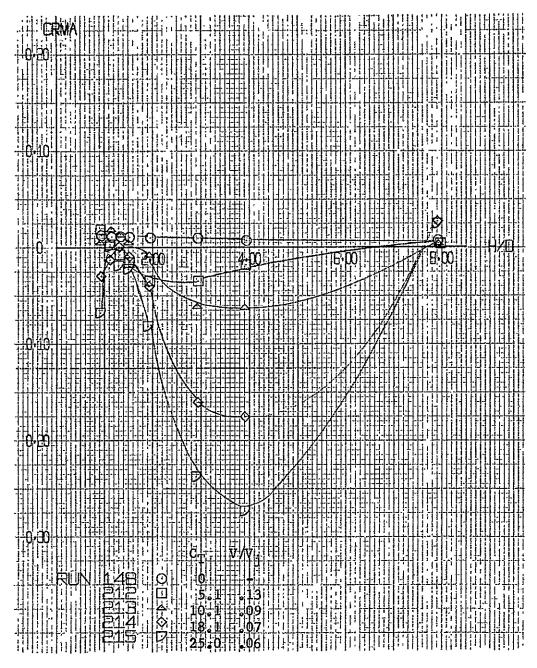


Figure A-29. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=-10^{\circ}$  (Concluded)

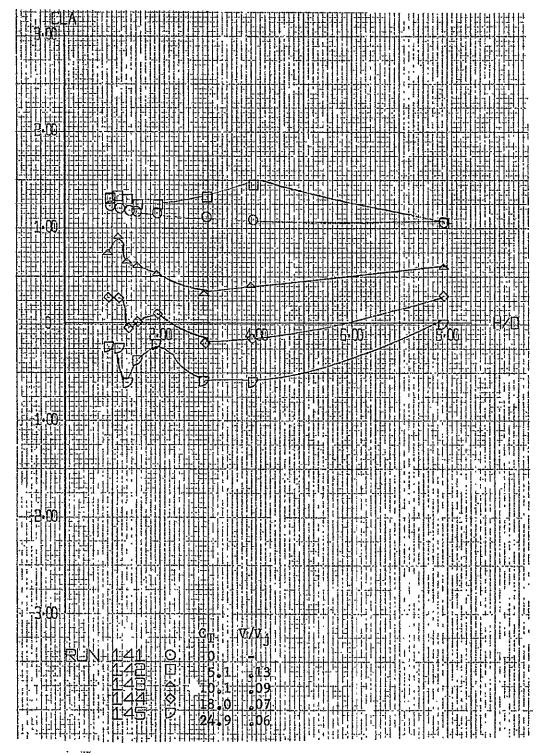


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10°

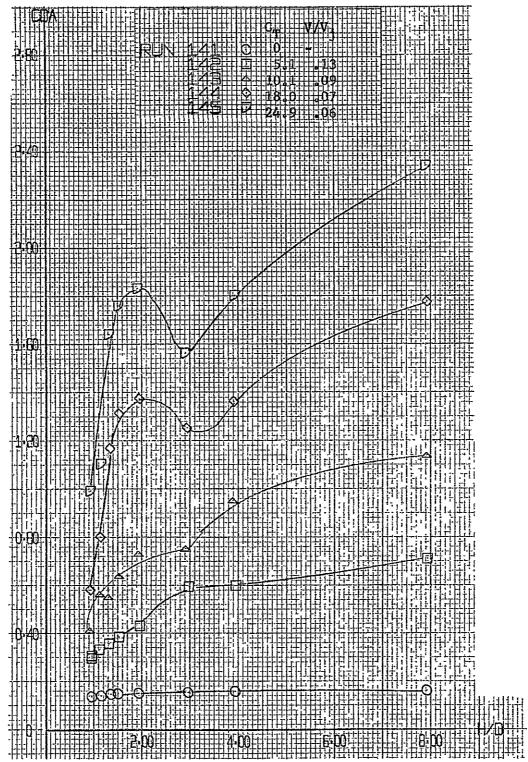


Figure A-30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=10^{\circ}$  (Continued)

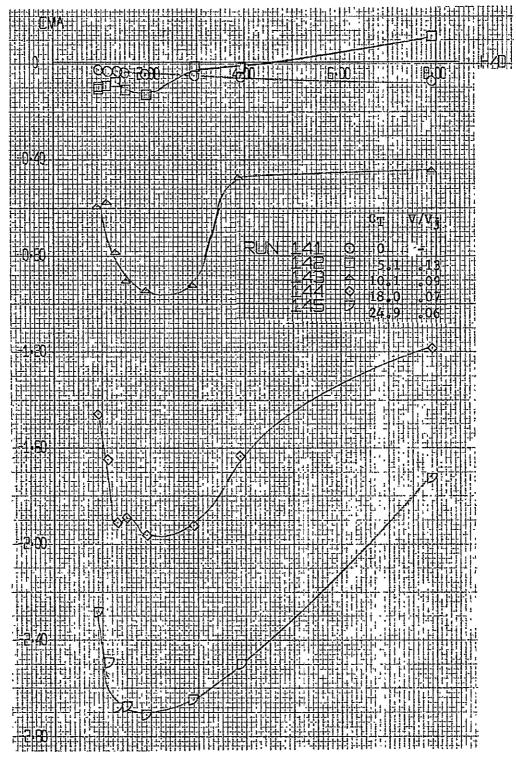


Figure A=30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

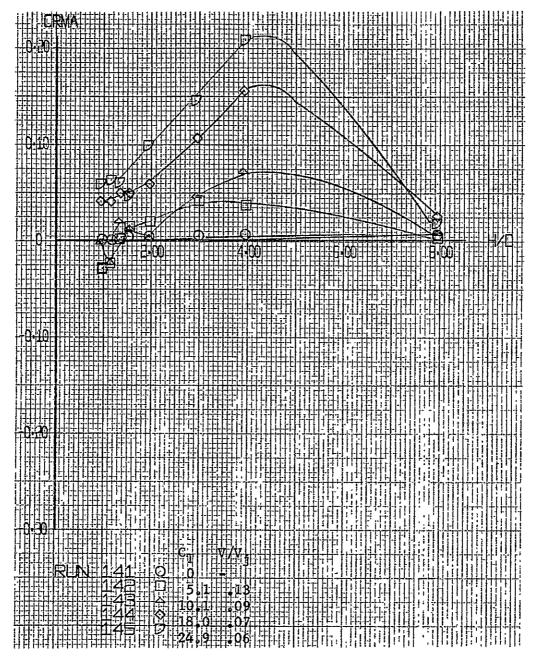


Figure A=30. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Concluded)

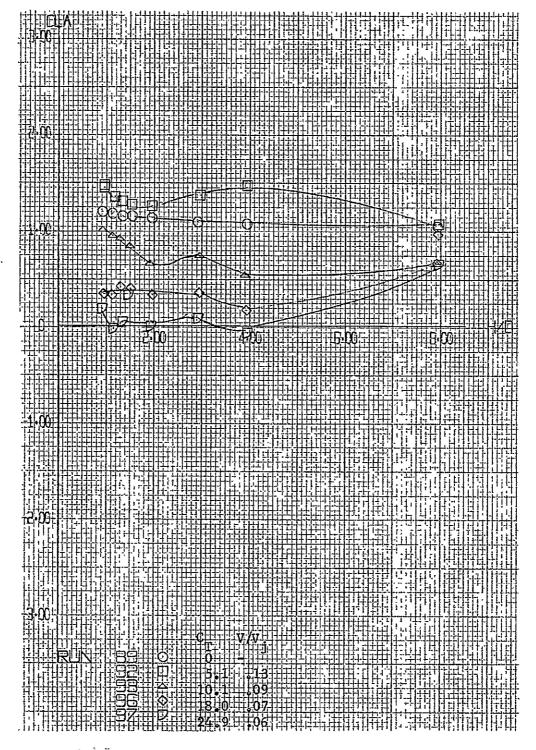


Figure A=31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$ 

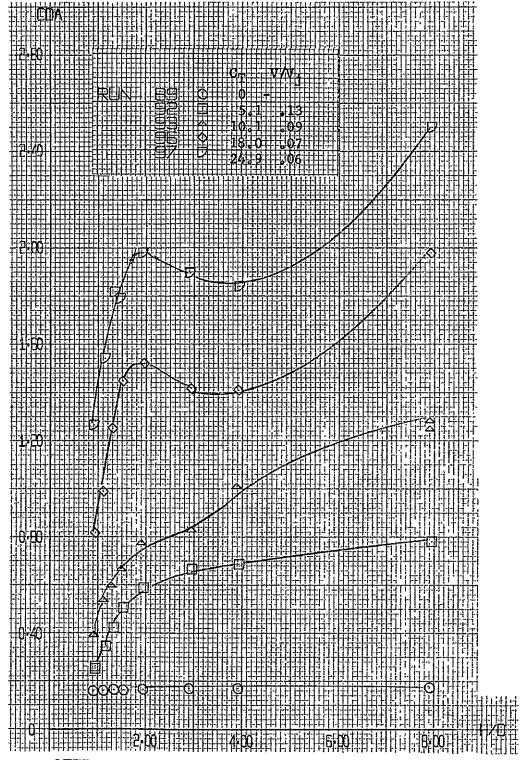


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=0^{\circ}$  (Continued)

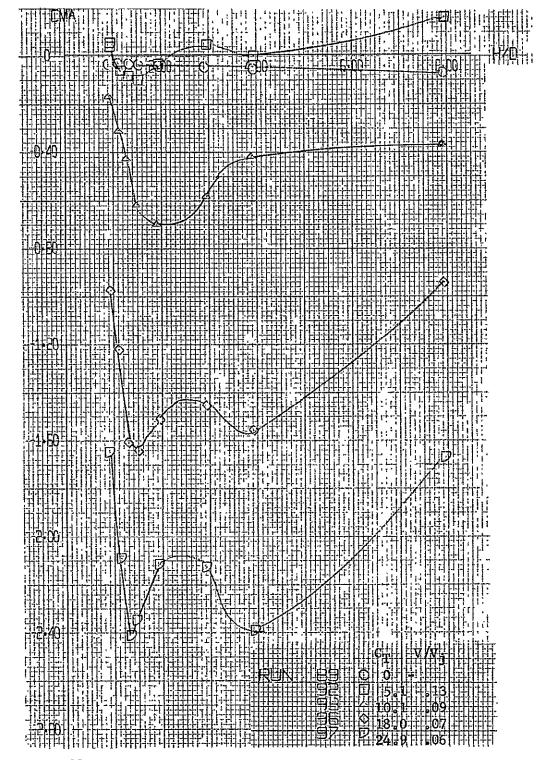


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

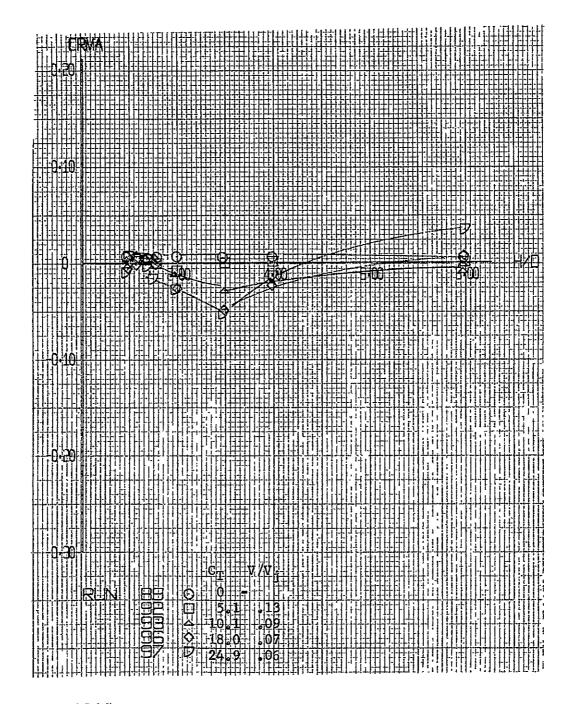


Figure A-31. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=0^{\circ}$  (Concluded)

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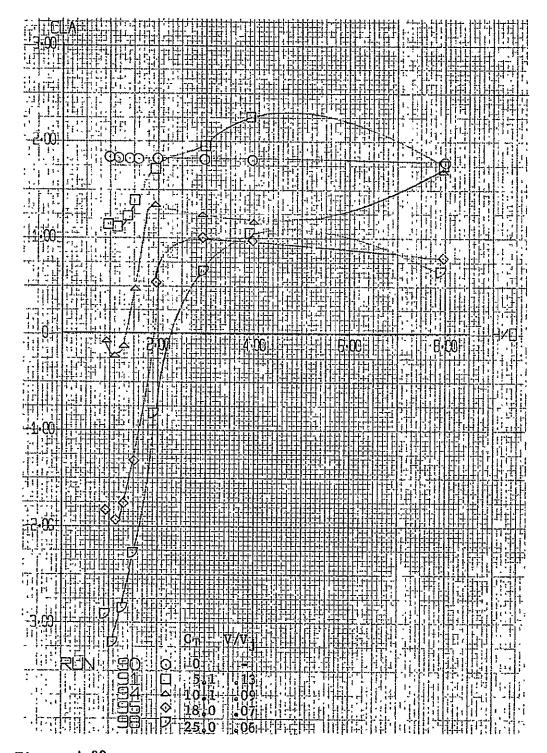


Figure A=32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N=90^\circ$ ;  $\alpha=8^\circ$ ;  $\emptyset=0^\circ$ 

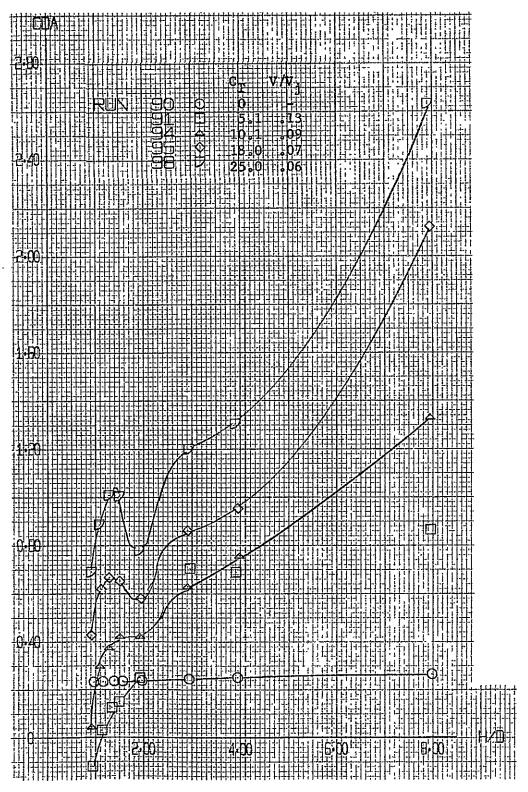


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N = 90^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

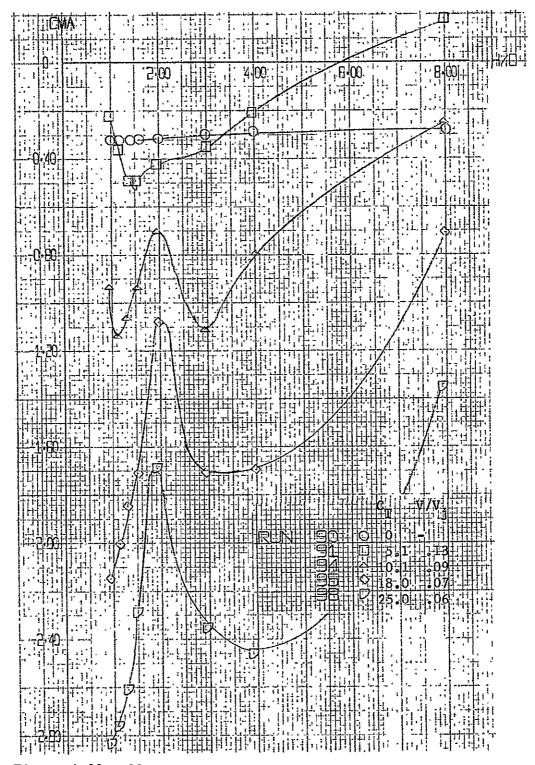


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=90^{\rm O}$ ;  $\alpha=8^{\rm O}$ ;  $\emptyset=0^{\rm O}$  (Continued)

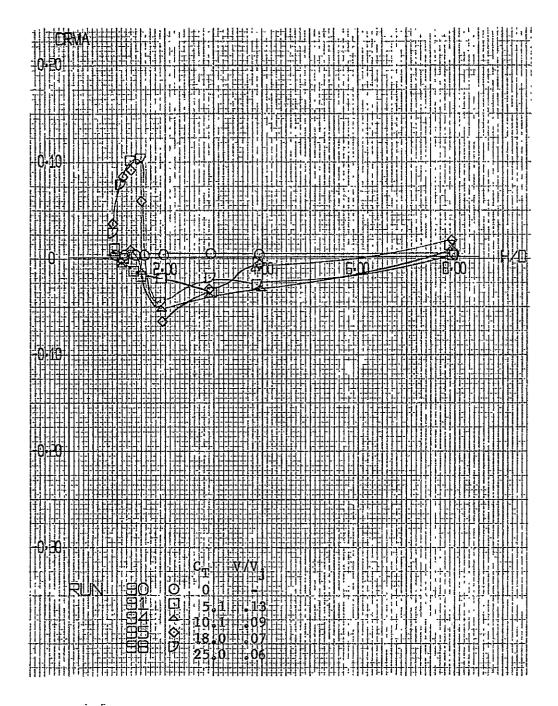


Figure A-32. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N=90^\circ$ ;  $\alpha=8^\circ$ ;  $\emptyset=0^\circ$  (Concluded)

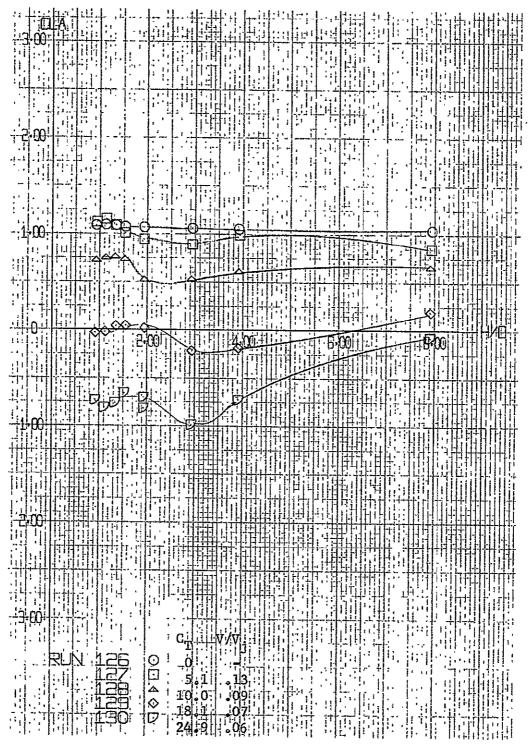
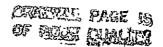


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_N$  = 90°;  $\alpha$  = 0°



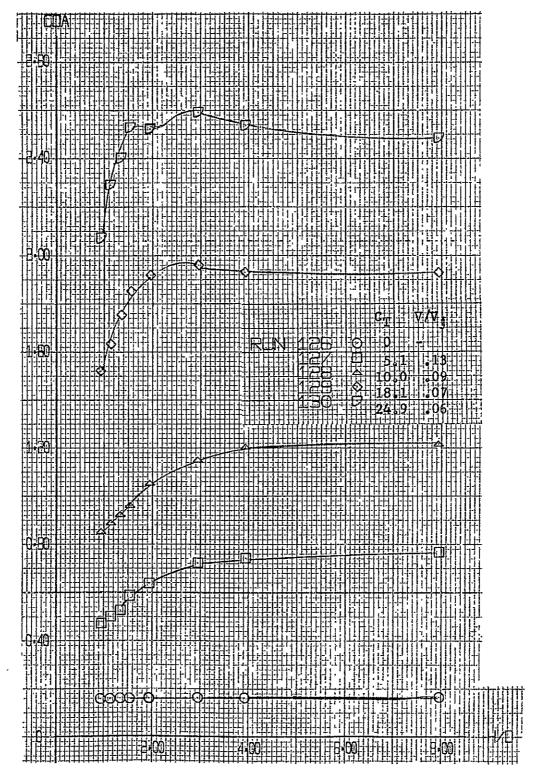


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\phi=0^{\rm o}$  (Continued)

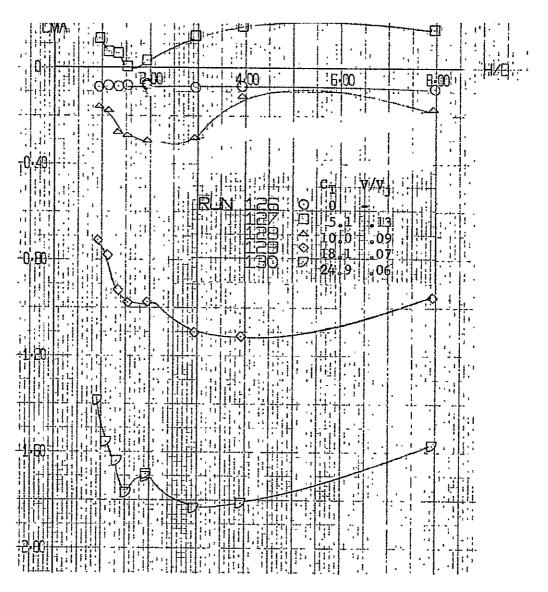


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=0^{\circ}$  (Continued)

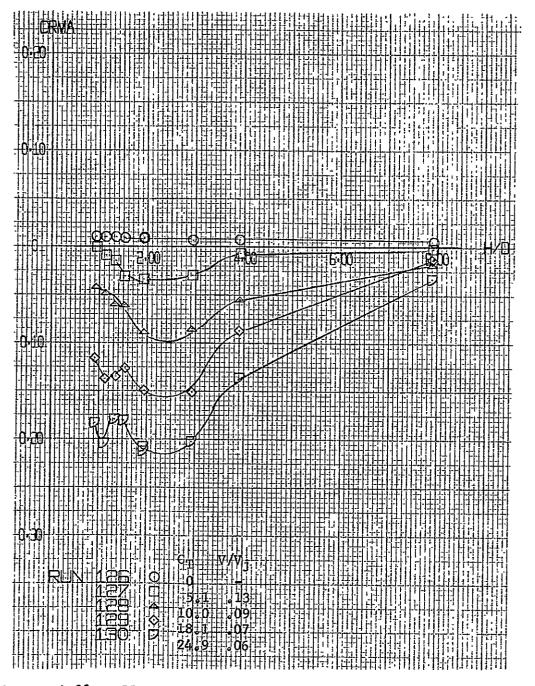


Figure A-33. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

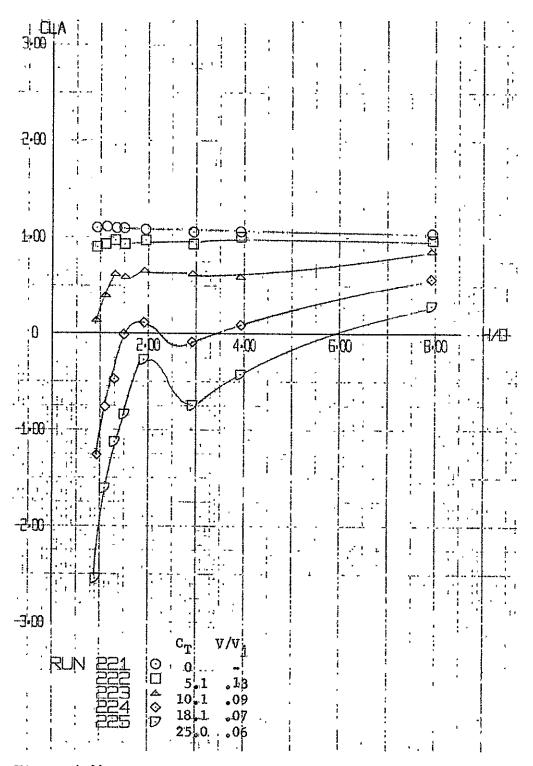


Figure A=34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$ 

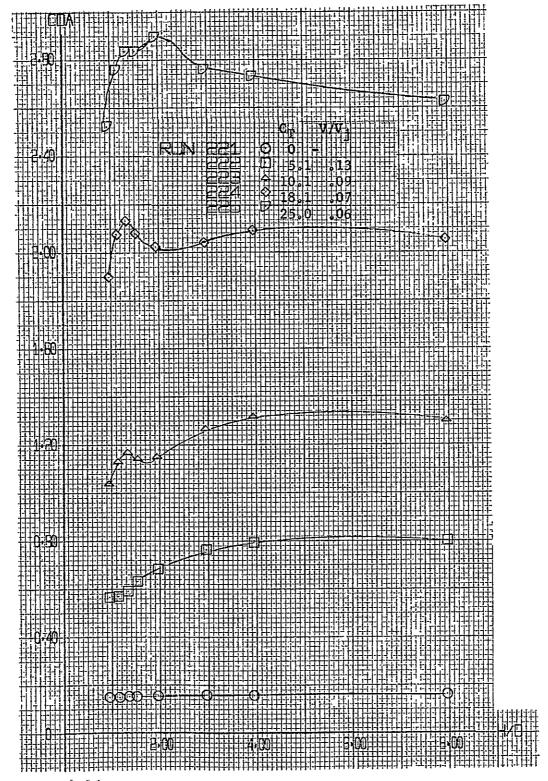


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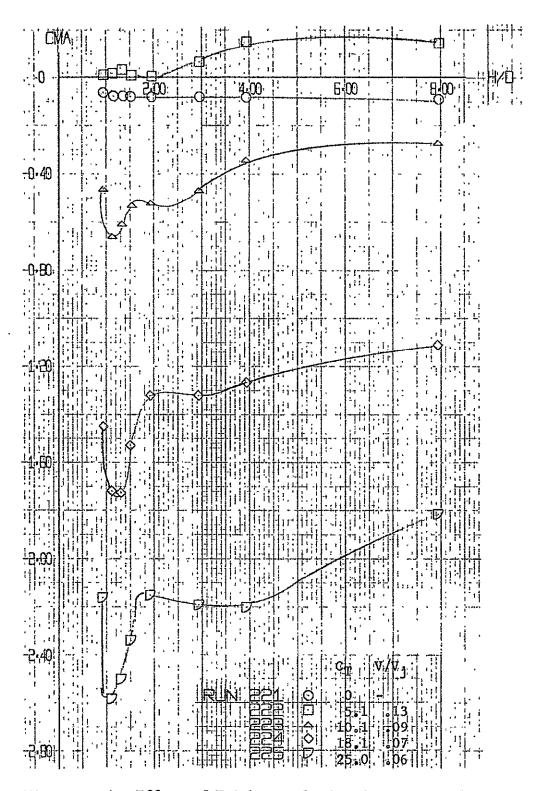


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=-10^{\circ}$  (Continued)

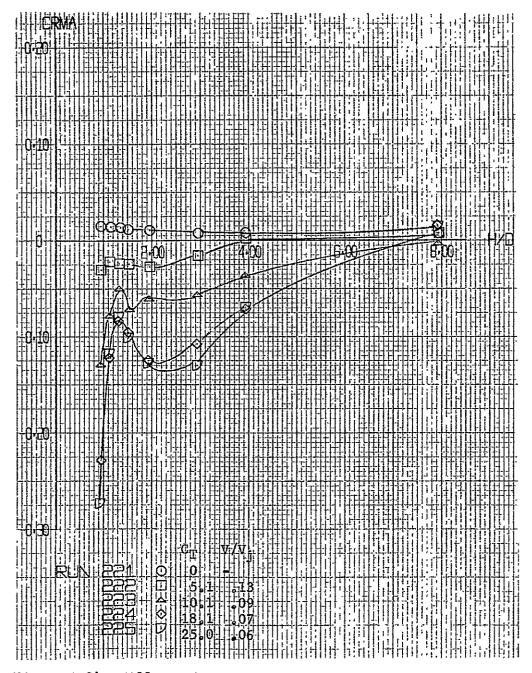


Figure A-34. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=-10^{\circ}$  (Concluded)

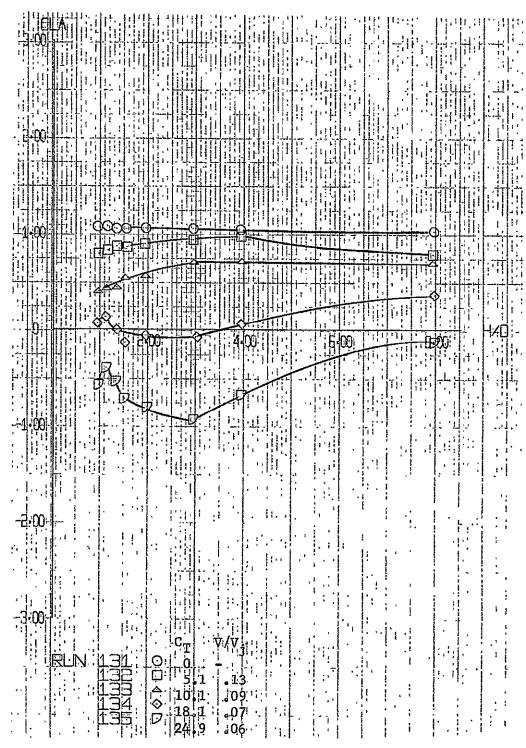


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10°

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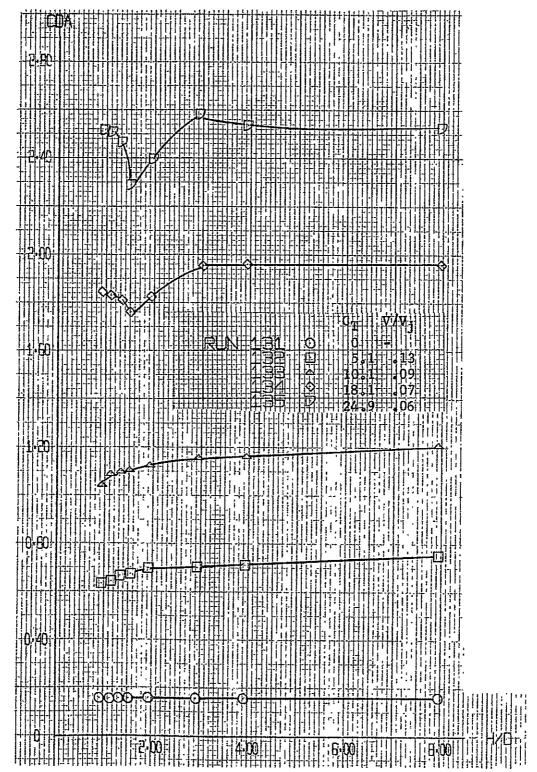


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

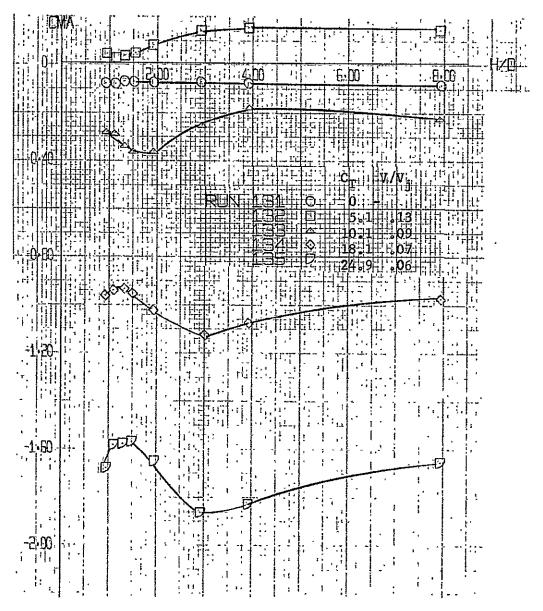


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

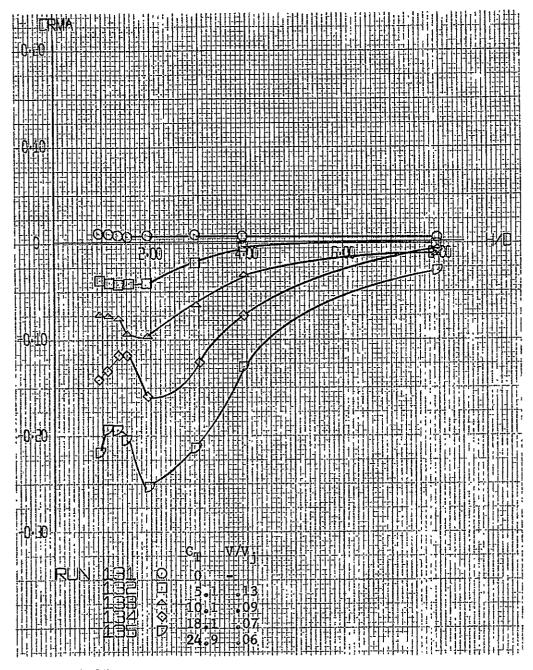


Figure A-35. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\phi=10^{\rm o}$  (Concluded)

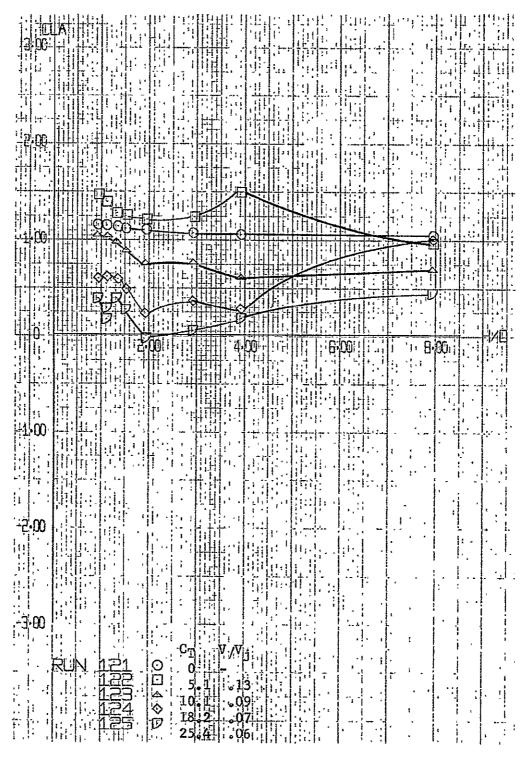


Figure A=36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\emptyset=0^{\rm o}$ 

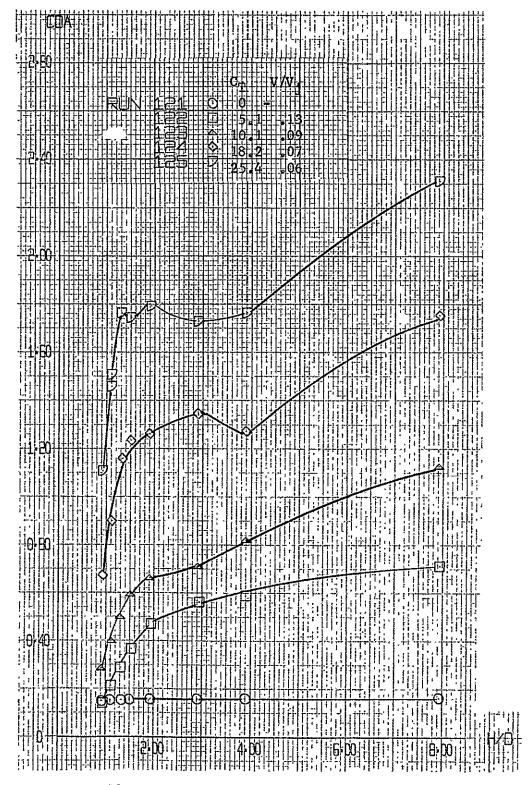


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = 0^\circ$  (Continued)

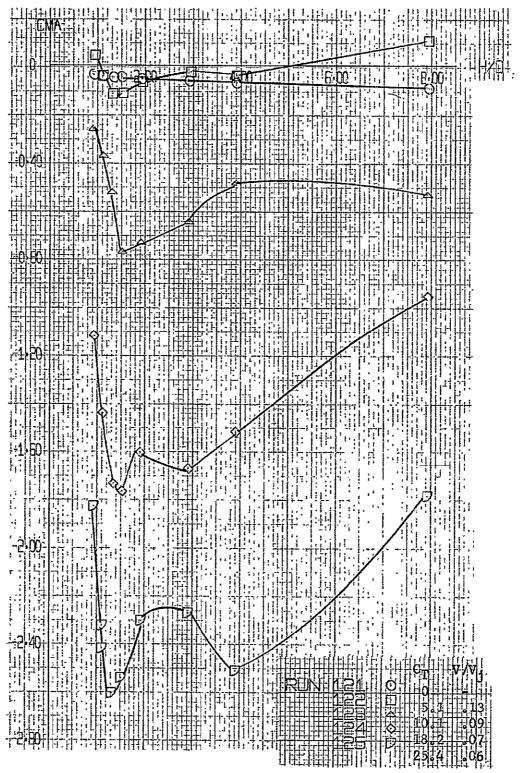


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=0^{\circ}$  (Continued)

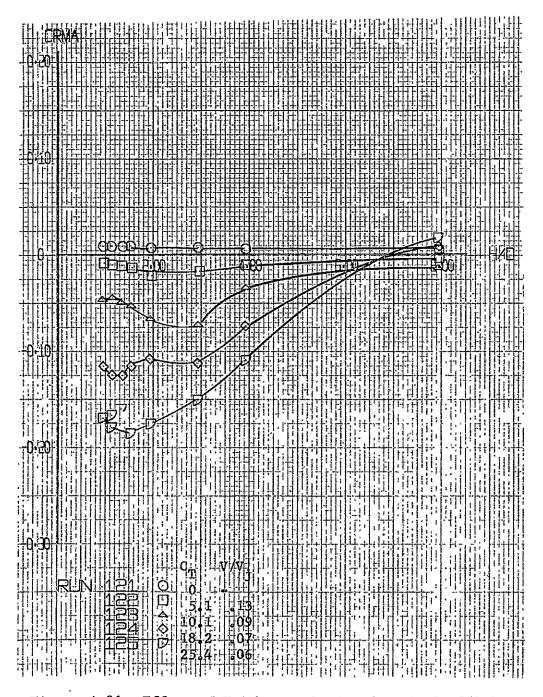


Figure A-36. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\circ};\;\alpha=0^{\circ};\;\emptyset=0^{\circ}$  (Concluded)

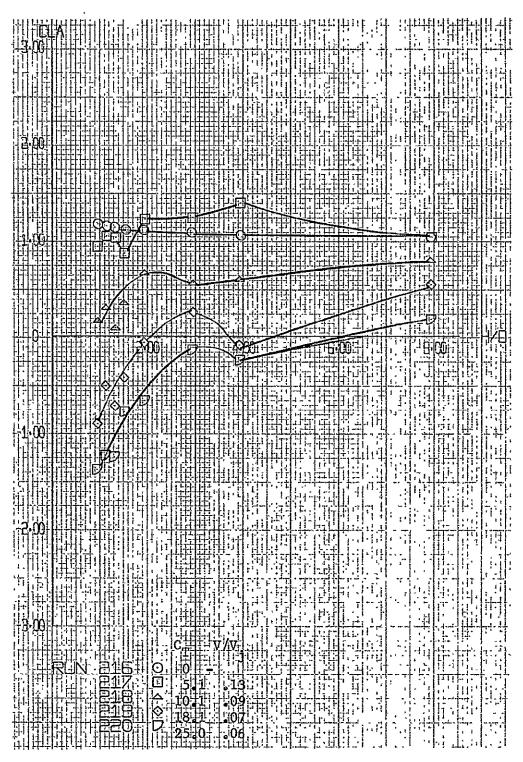


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\rm o};~\alpha=0^{\rm o};~\emptyset=-10^{\rm o}$ 

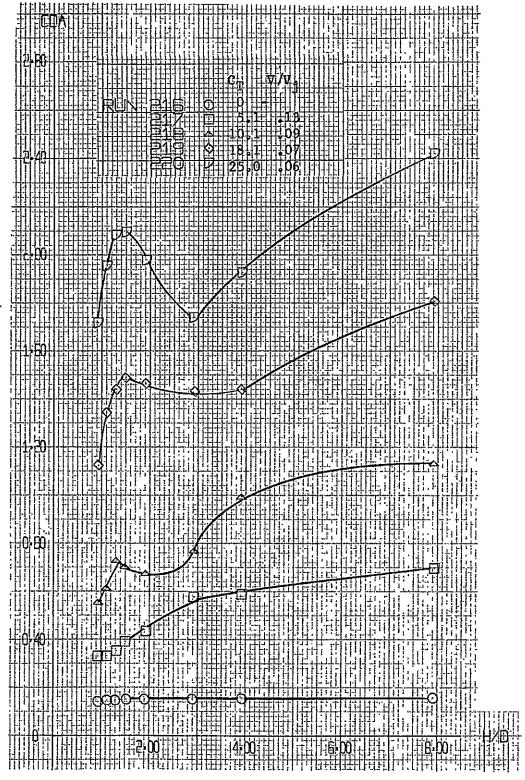


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=-10^{\rm o}$  (Continued)

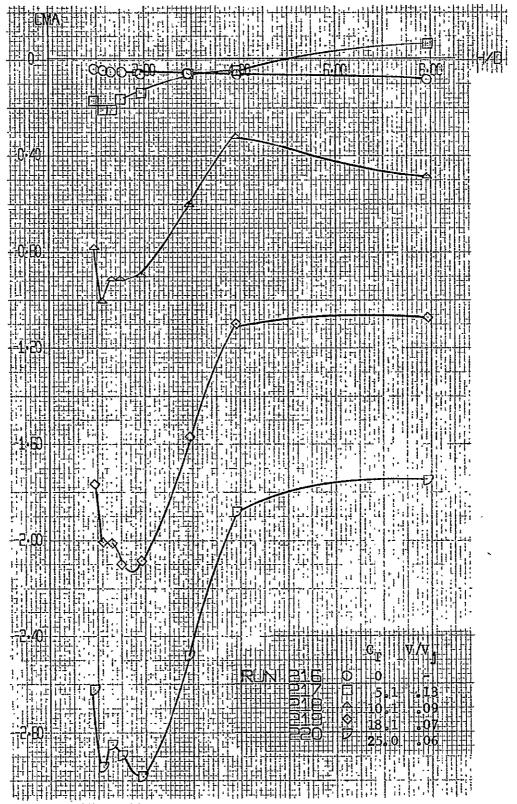


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\rm o};~\alpha=0^{\rm o};~\emptyset=\pm10^{\rm o}$  (Continued)

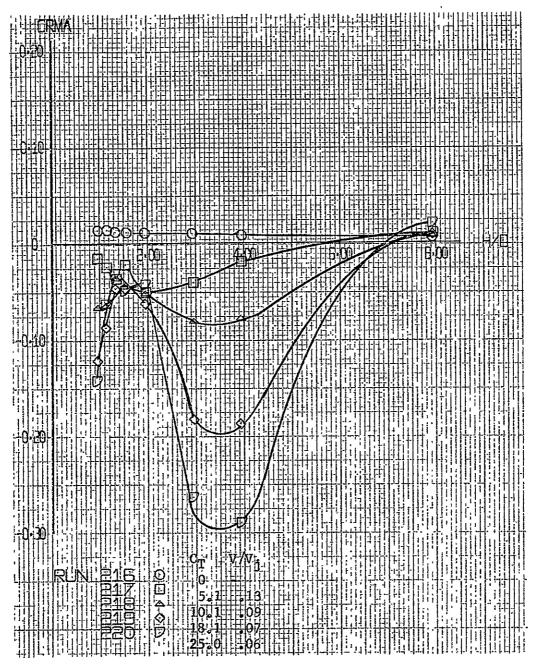


Figure A-37. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = -10^\circ$  (Concluded)

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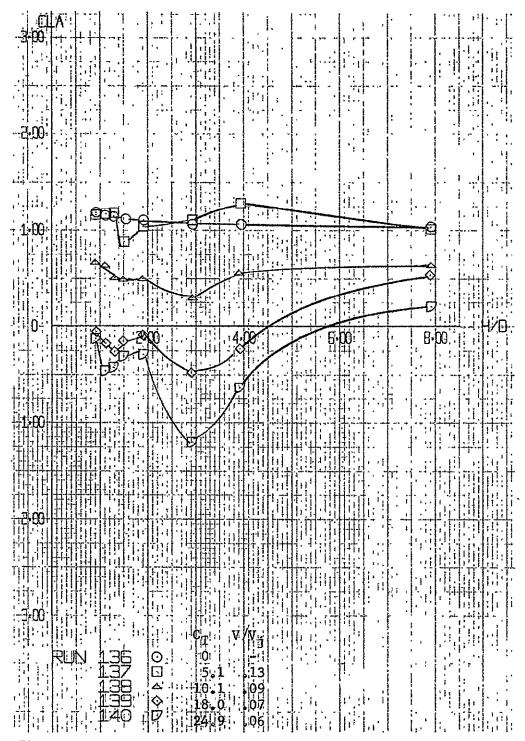


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10°

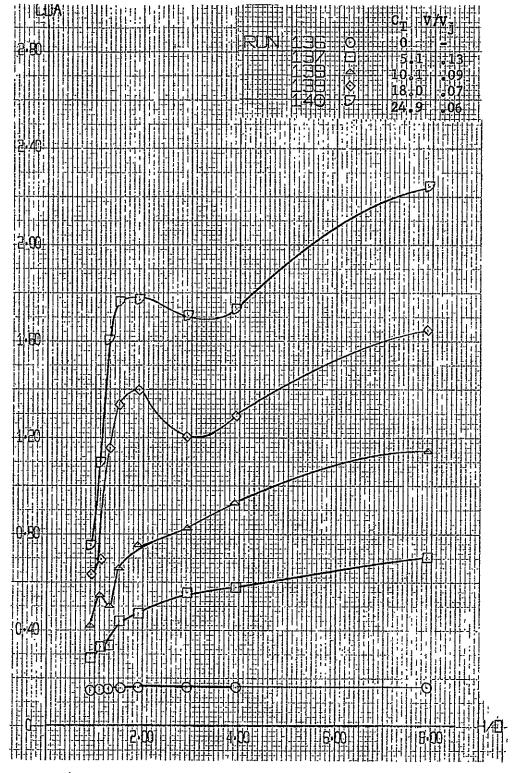


Figure A=38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=90^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=10^{\circ}$  (Continued)

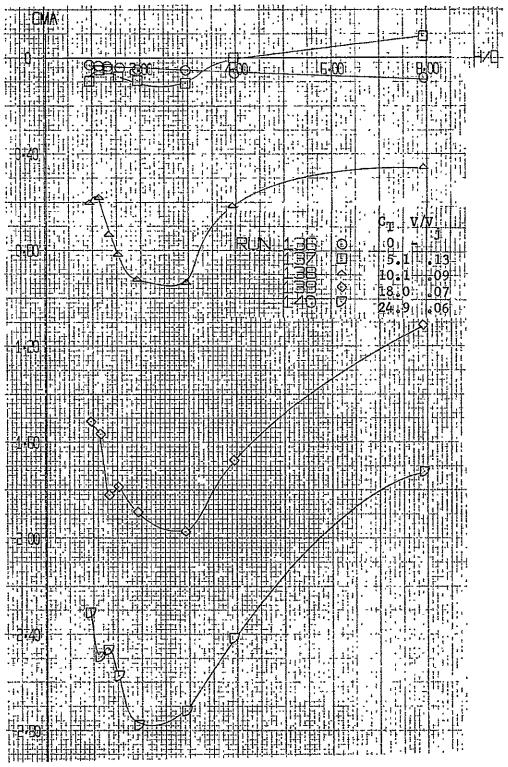


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

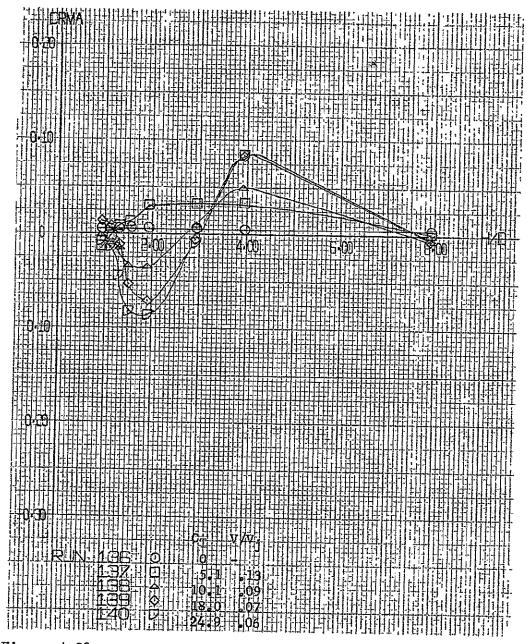


Figure A-38. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N} = 90^{\circ}$ ;  $\alpha = 0^{\circ}$ ;  $\beta = 10^{\circ}$  (Concluded)

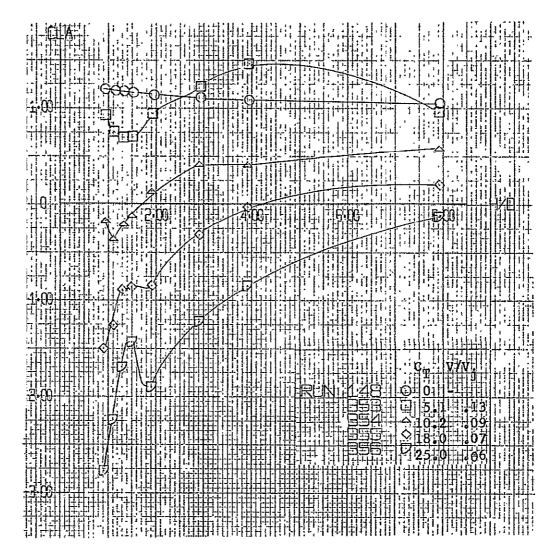


Figure A=39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ; Ø =  $-10^{\rm o}$ 

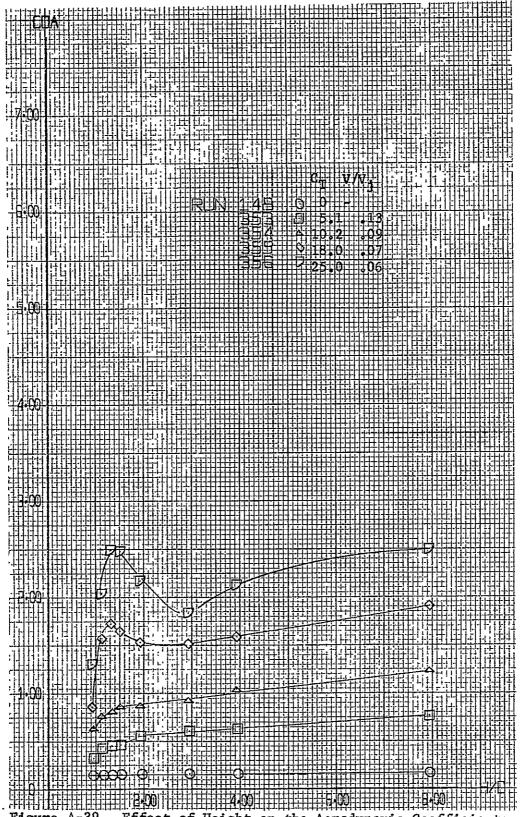


Figure A=39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\phi = -10^\circ$  (Continued)

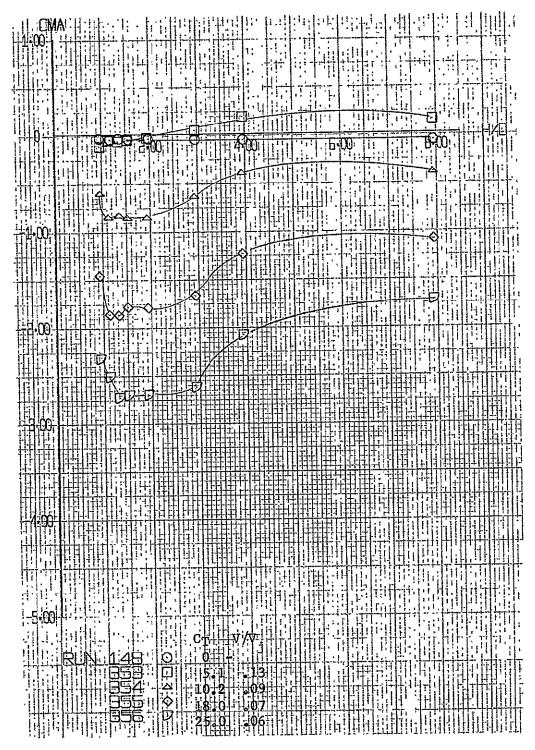


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = -10^\circ$  (Continued)

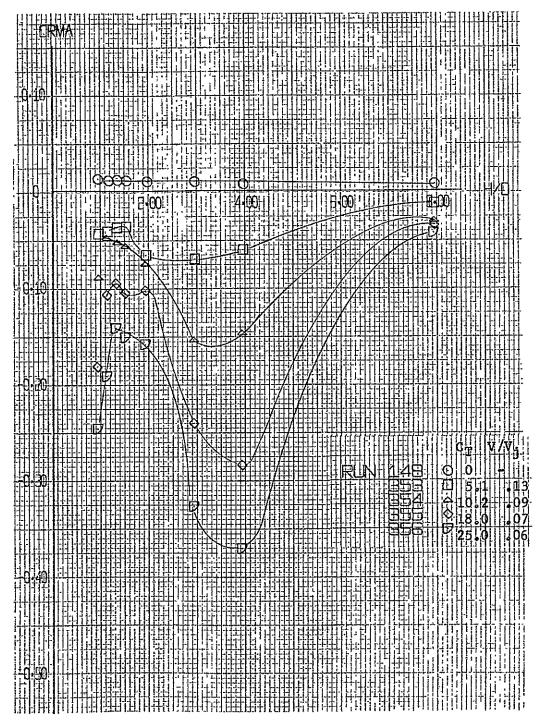


Figure A-39. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L$  = .8, Ground Board Configuration;  $\delta_N$  = 90°;  $\alpha$  = 0°;  $\beta$  = -10° (Concluded)

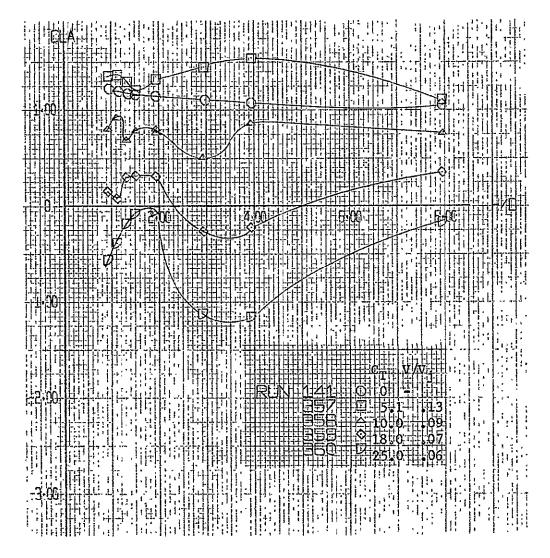


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_{L_0} = .8, \text{ Ground Board Configuration 1, } \delta_N = 90^\circ;$   $\alpha = 0^\circ; \ \emptyset = 10^\circ$ 

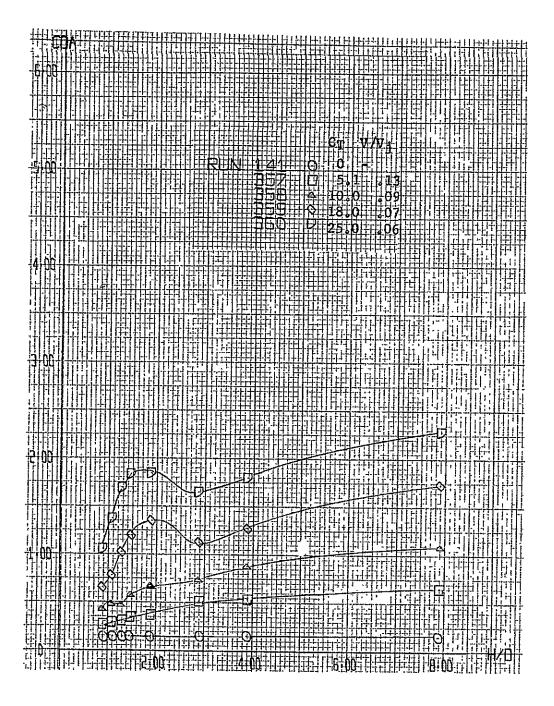


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1,  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\beta = 10^\circ$  (Continued)

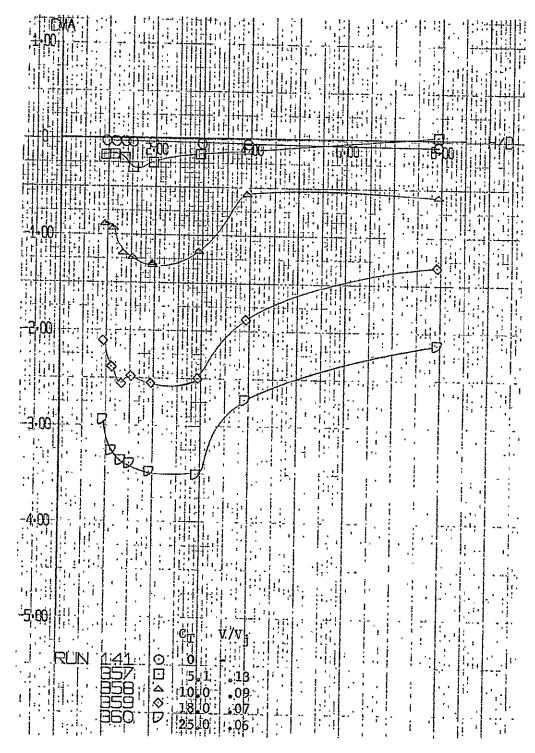


Figure A=40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1,  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=10^\circ$  (Continued)

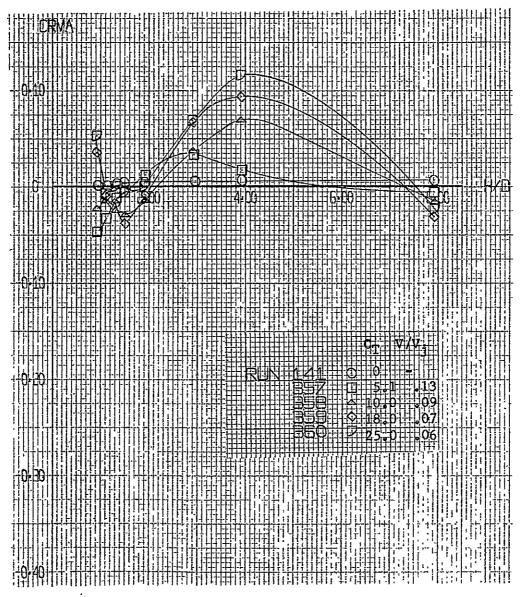


Figure A-40. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1,  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Concluded)

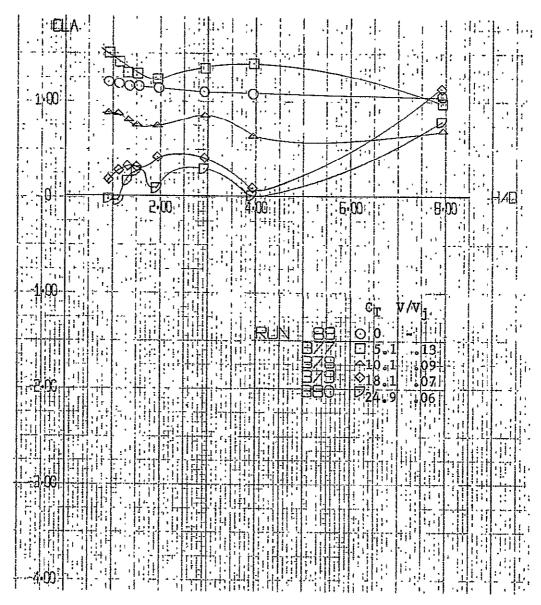


Figure A=41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=90^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\emptyset=0^{\rm o}$ 

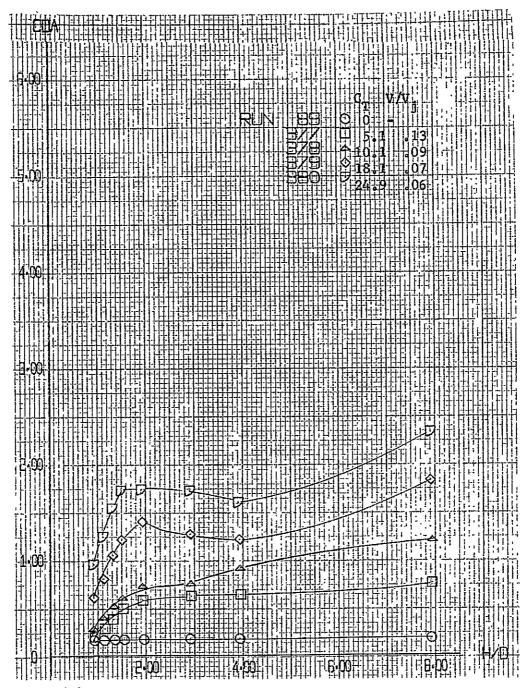


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\phi = 0^\circ$  (Continued)

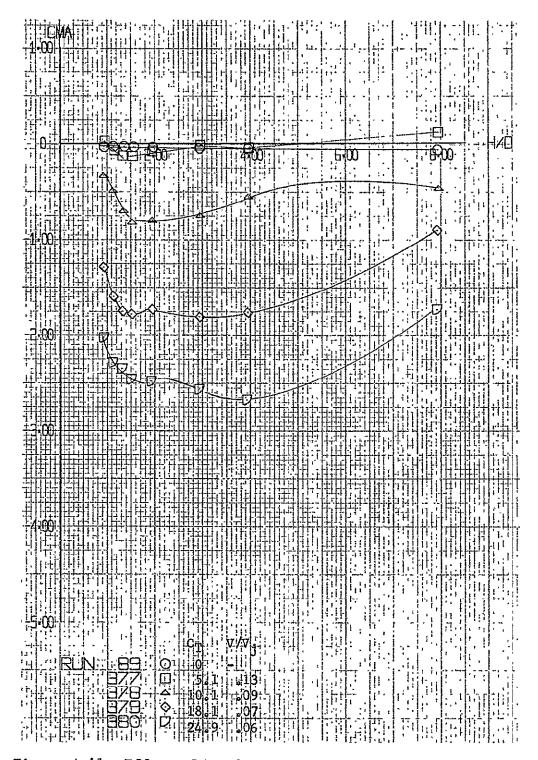


Figure A-41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1,  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

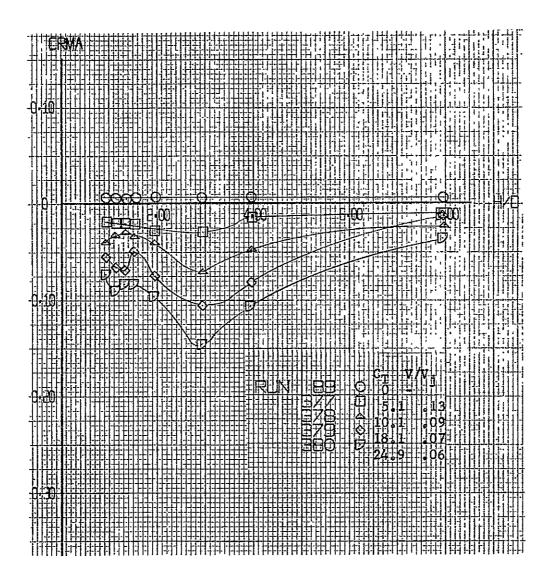


Figure A=41. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1,  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Concluded)

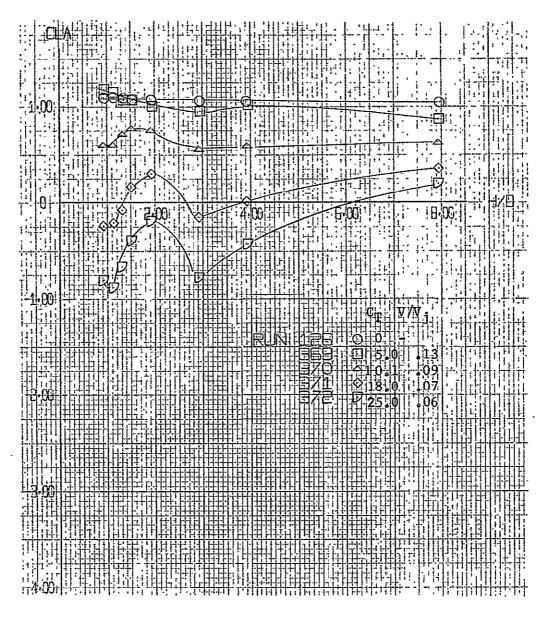


Figure A=42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$ 

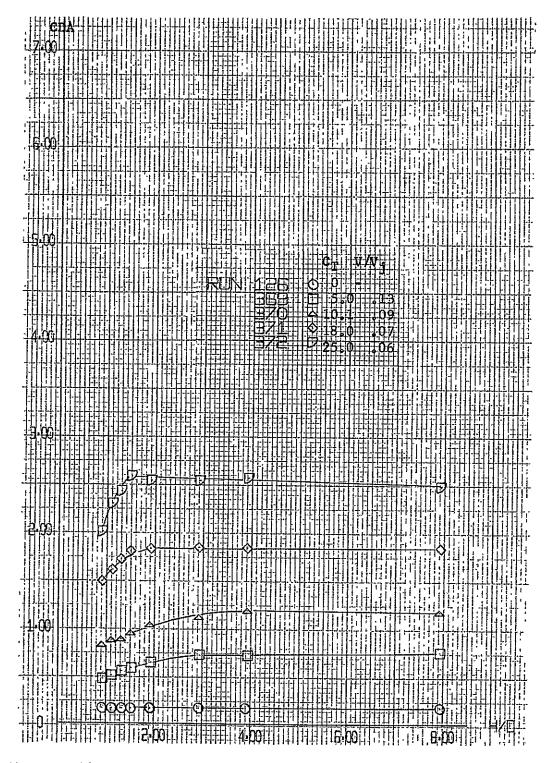


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Continued)

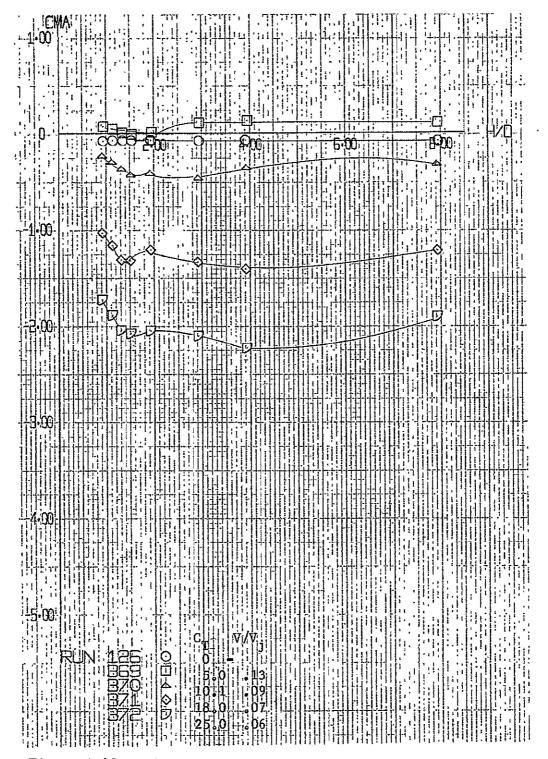


Figure A-42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Continued)

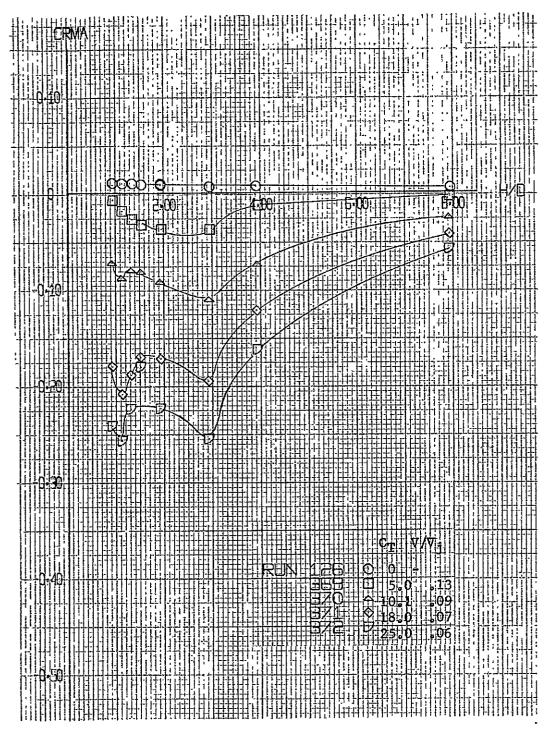


Figure A=42. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\beta = 0^\circ$  (Concluded)

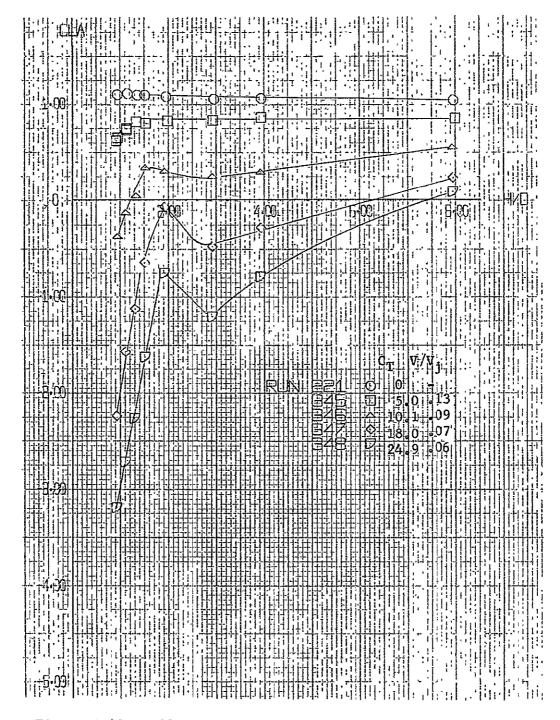


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=-10^\circ$ 

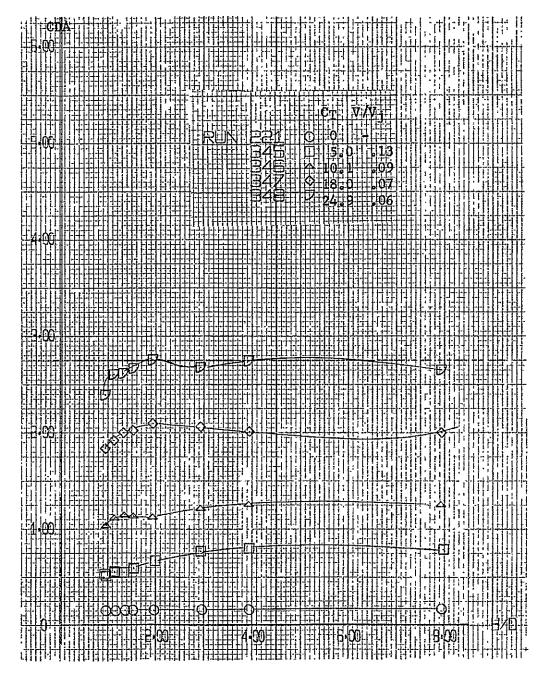


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\phi = -10^\circ$  (Continued)

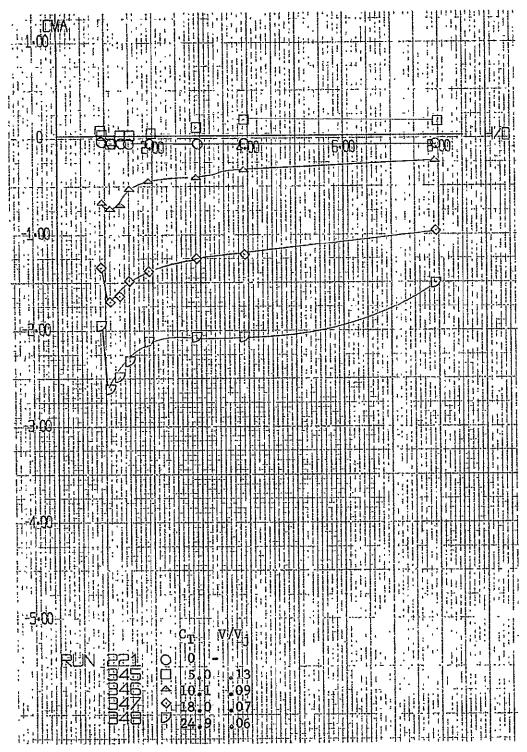


Figure A=43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Continued)

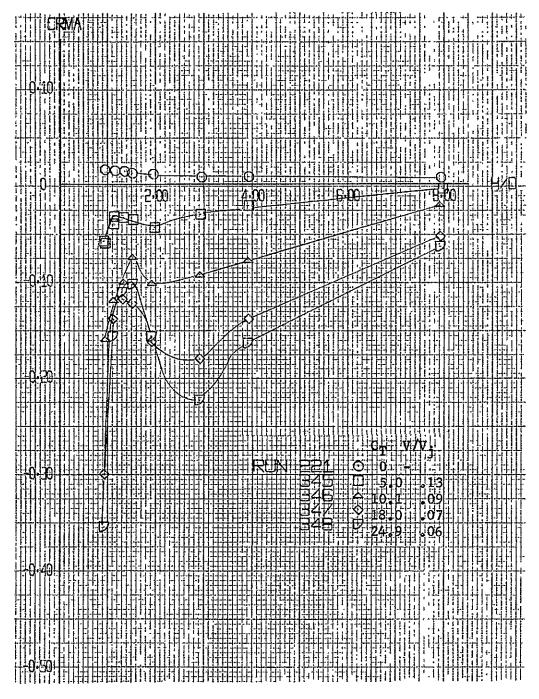


Figure A-43. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = -10^\circ$  (Concluded)

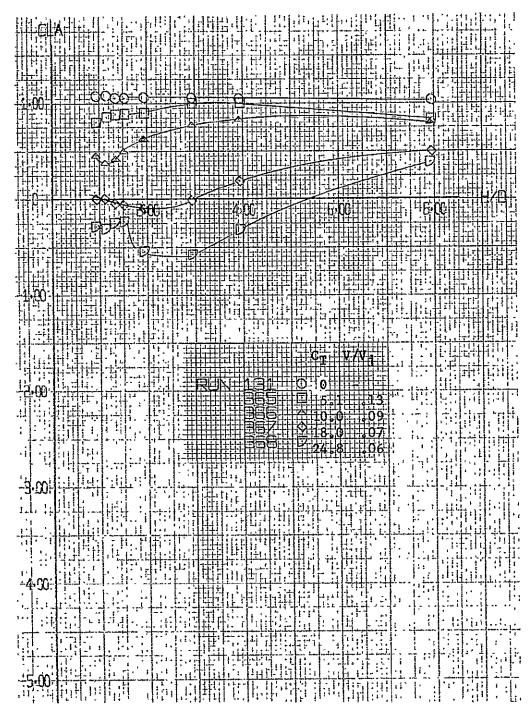


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=10^\circ$ 

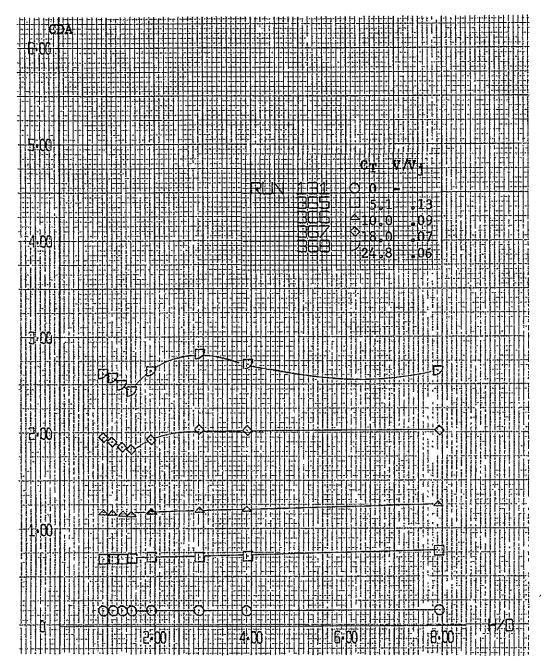


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)

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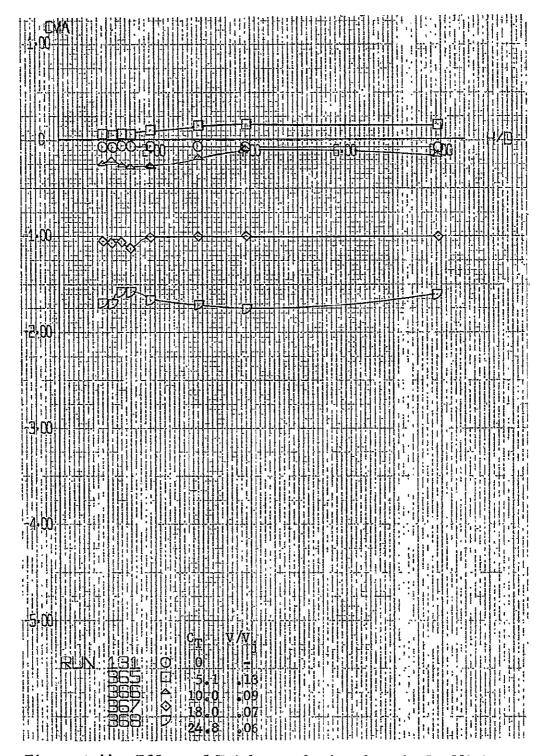


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)

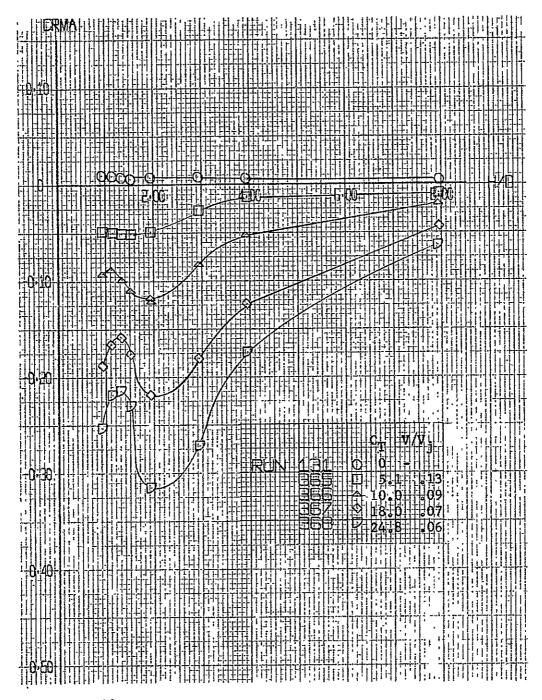


Figure A-44. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Concluded)

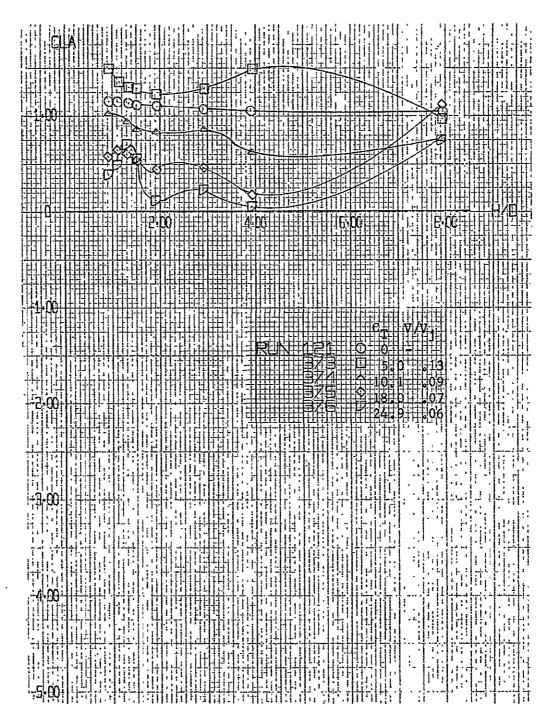


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\beta = 0^\circ$ 

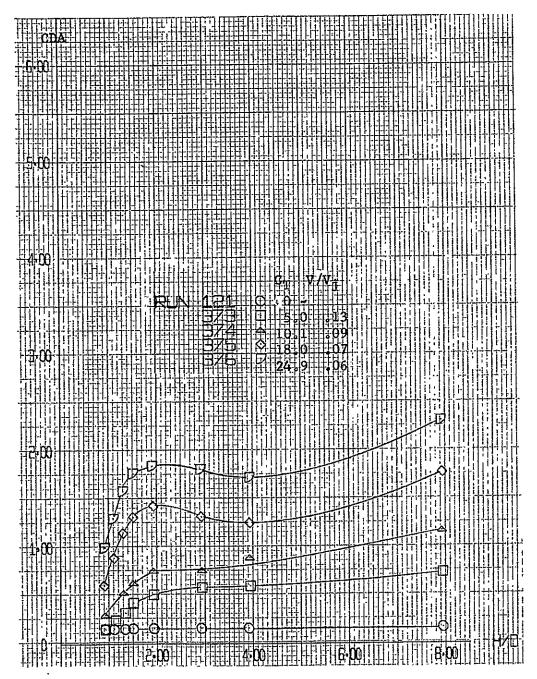


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

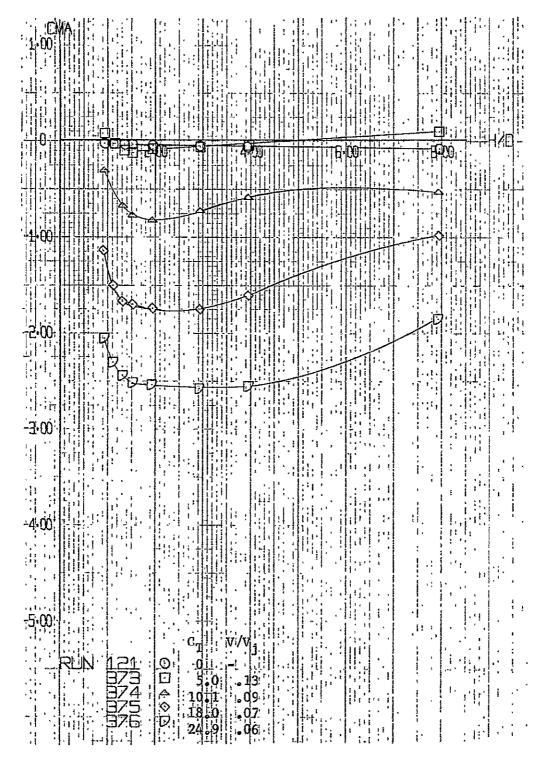


Figure A=45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_{L_0}=.8$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Continued)

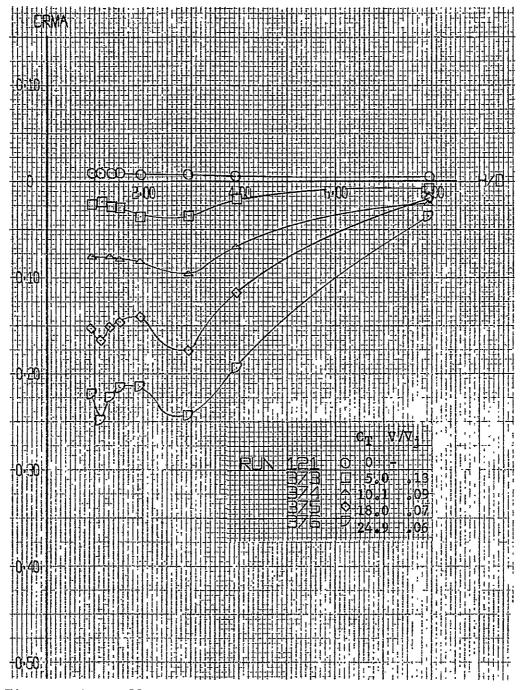


Figure A-45. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Concluded)

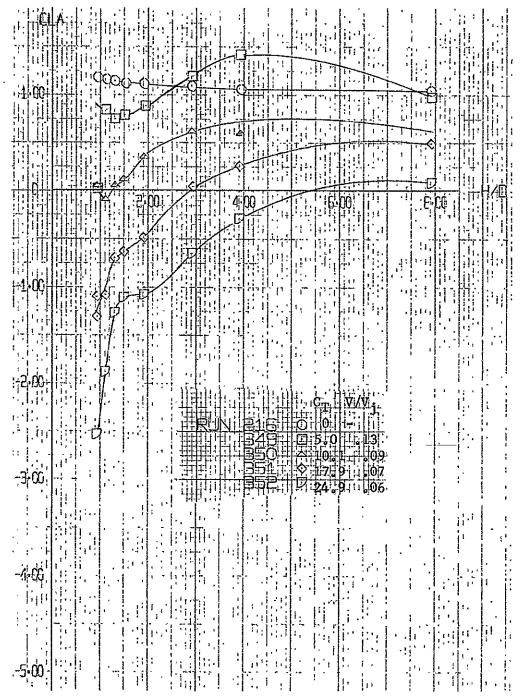


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = -10^\circ$ 

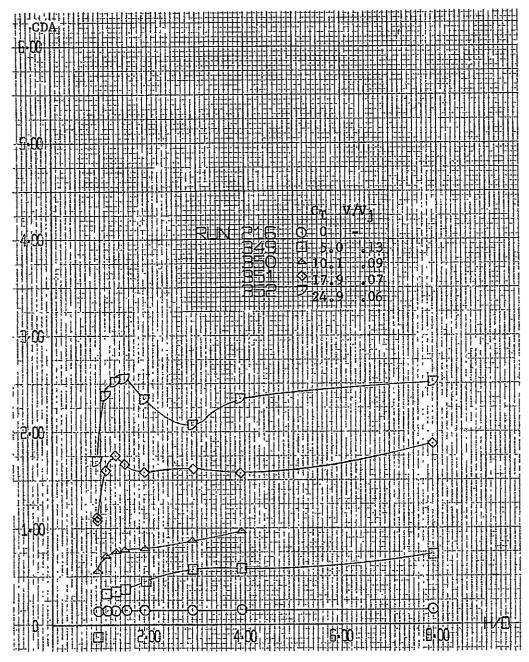


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = -10^\circ$  (Continued)

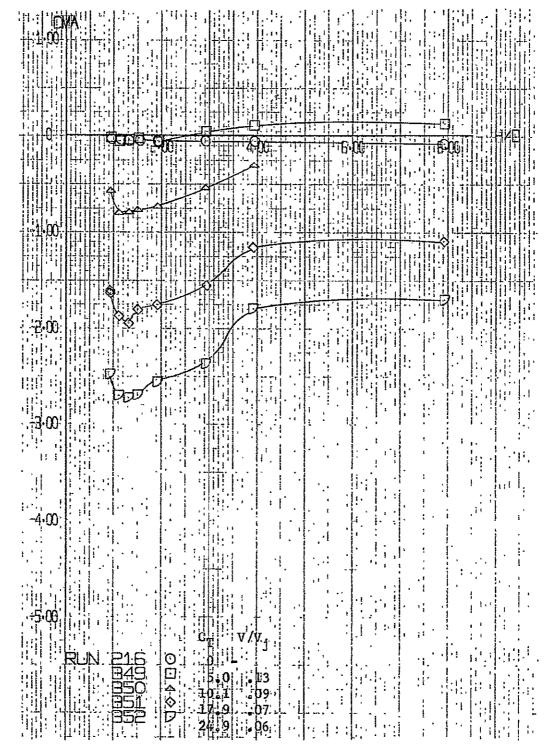


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Continued)



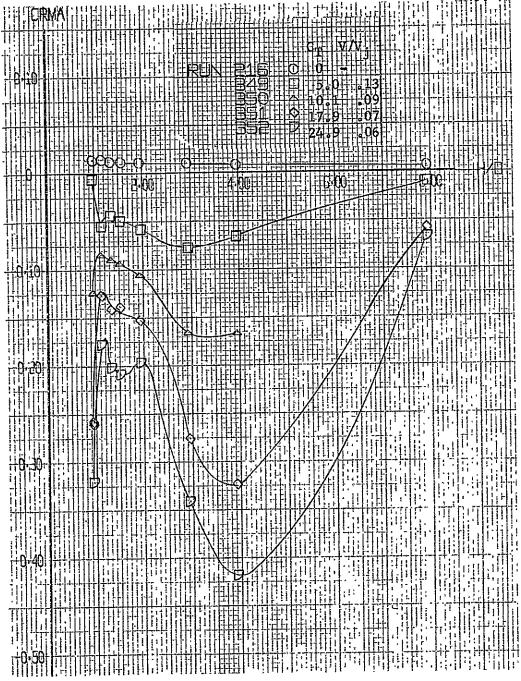


Figure A-46. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=-10^\circ$  (Concluded)

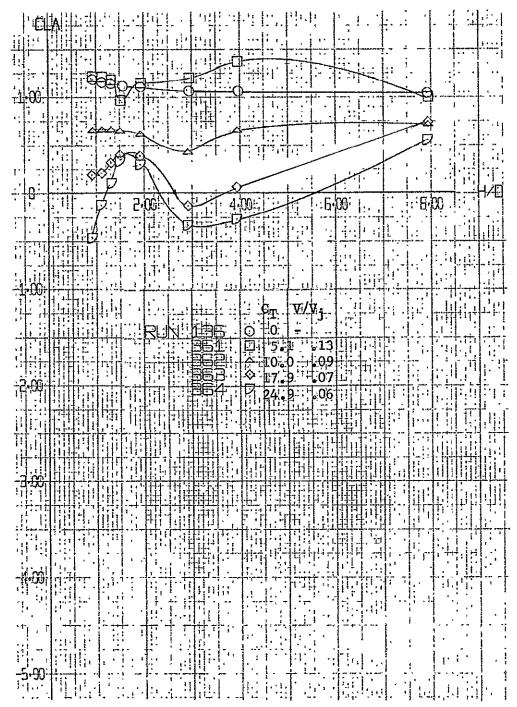


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=10^\circ$ 

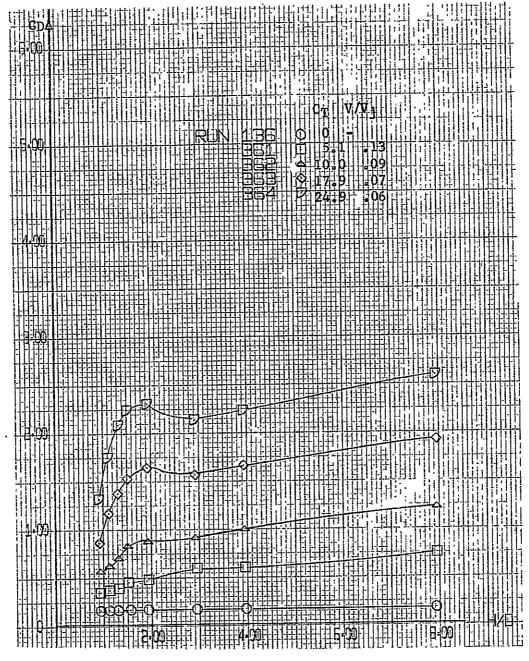


Figure A-47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_{Lo} = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = 10^\circ$  (Continued)

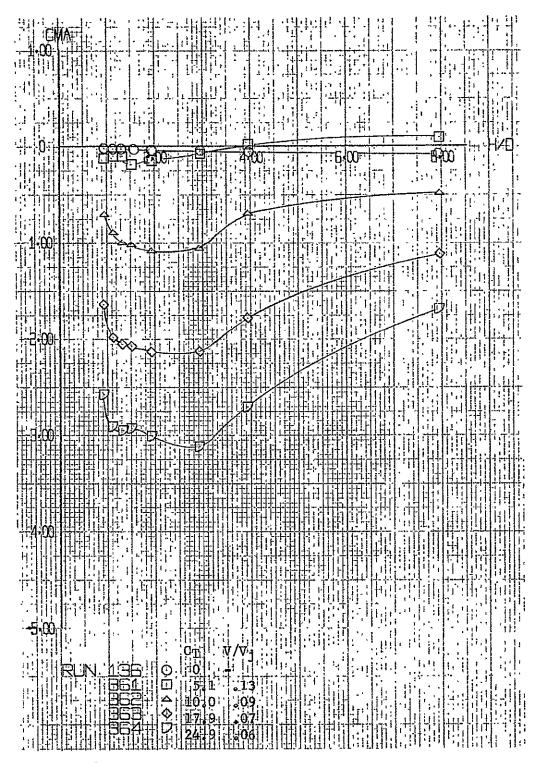


Figure A=47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)

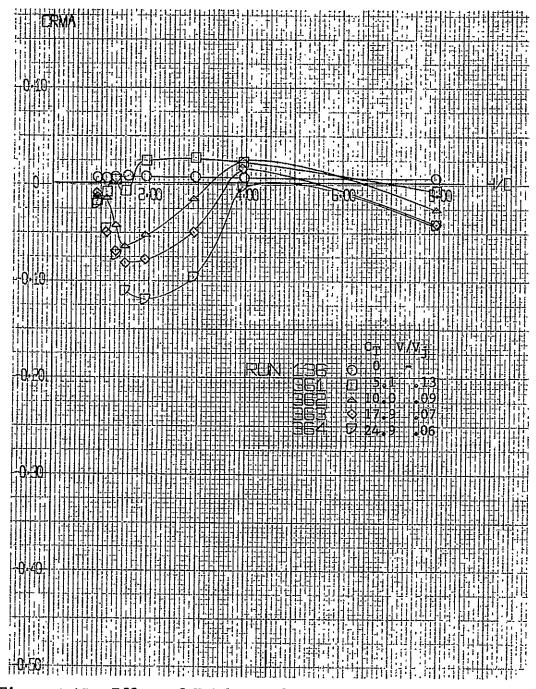


Figure A=47. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Concluded)

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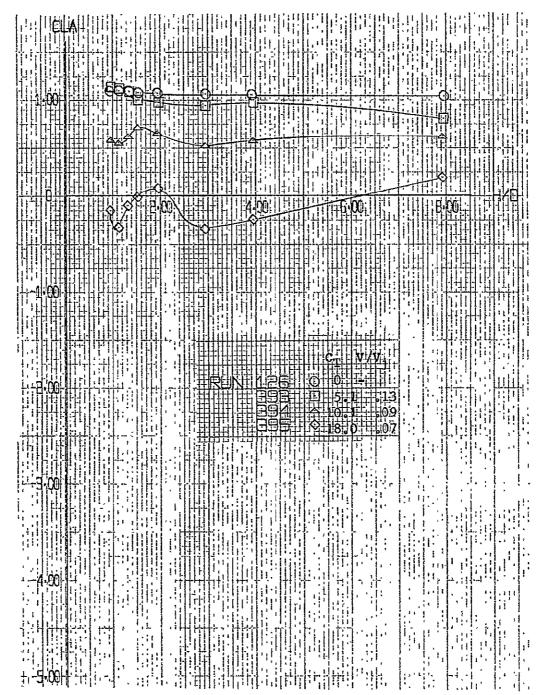


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$ 

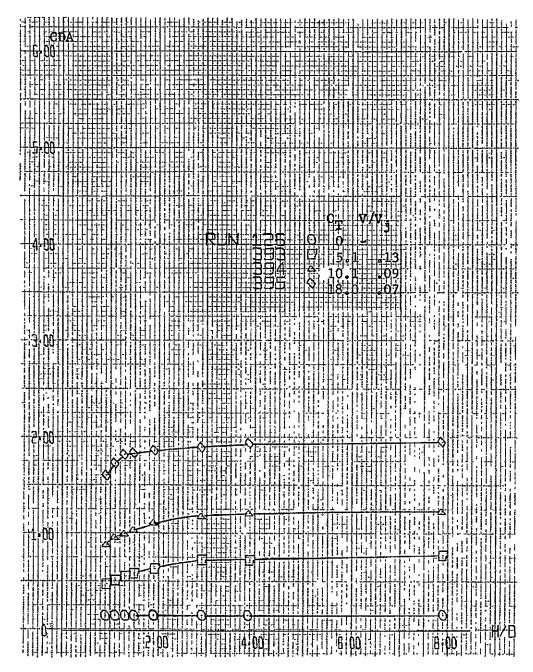


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_{Lo}=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Continued)

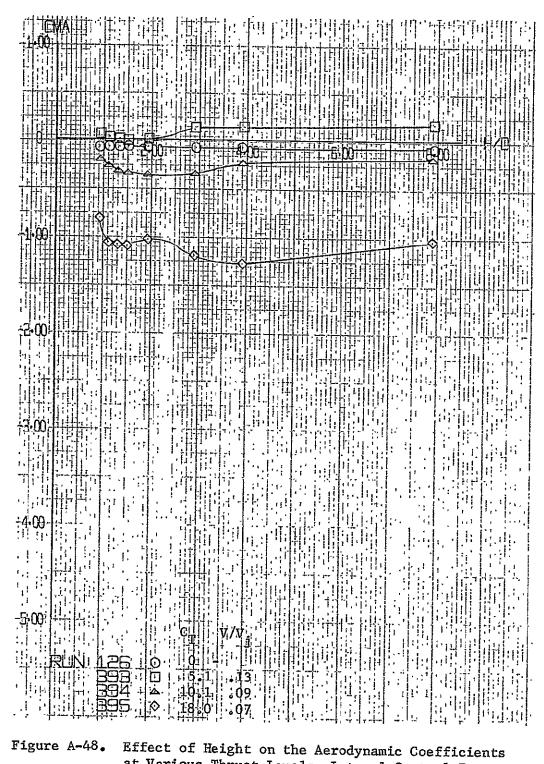


Figure A-48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Continued)

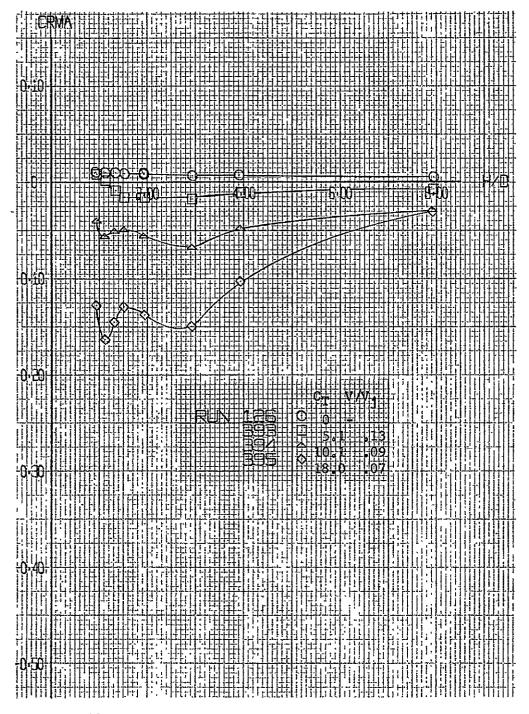


Figure A=48. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\theta=0^\circ$  (Concluded)

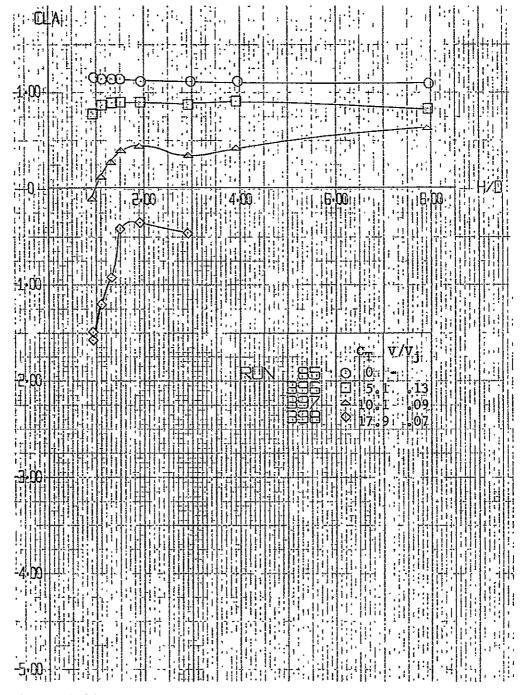


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=-10^\circ$ 

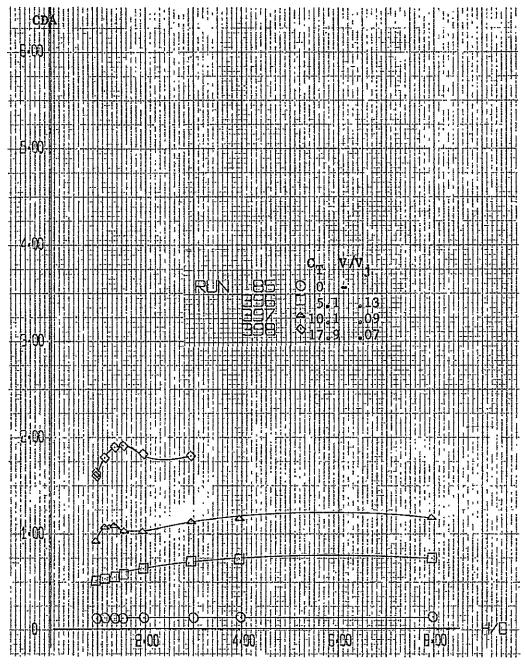


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = 1.2$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = -10^\circ$  (Continued)

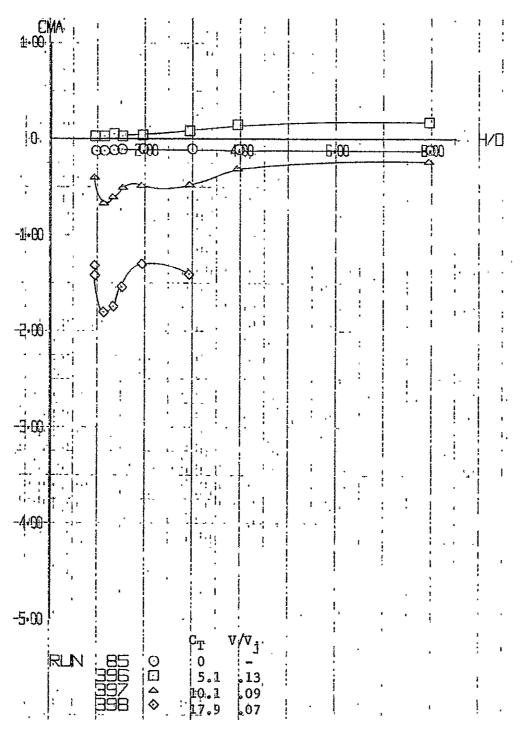


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 5;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Continued)

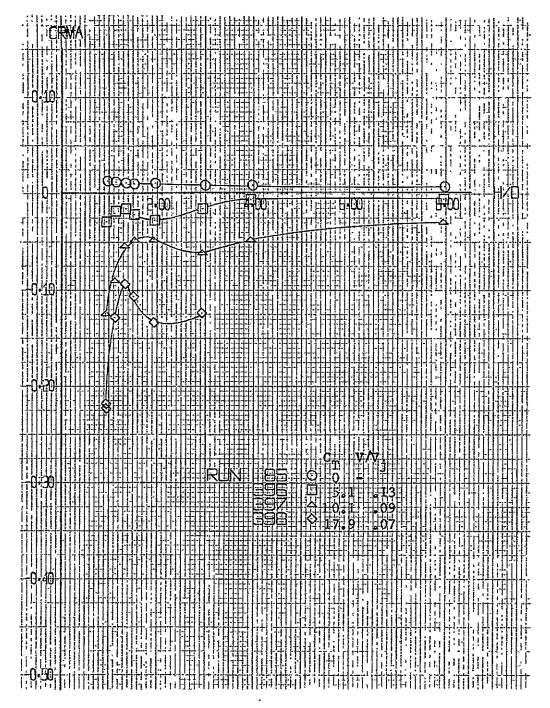


Figure A-49. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = 1.2$ , Ground Board Configuration 5;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = -10^\circ$  (Concluded)

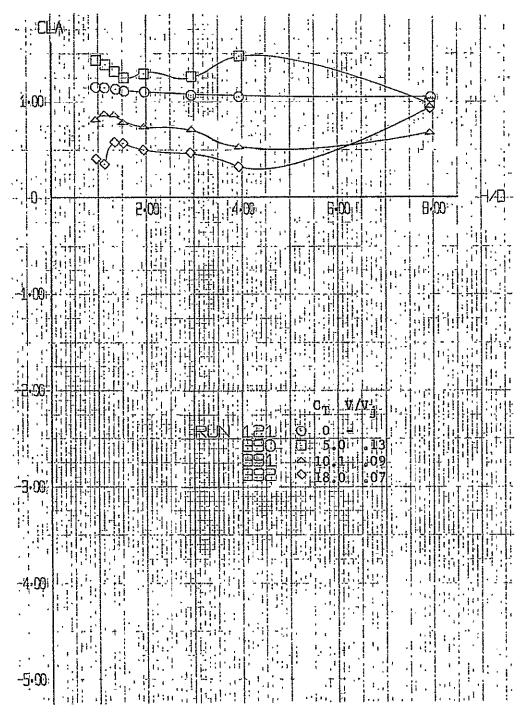


Figure A=50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$ 

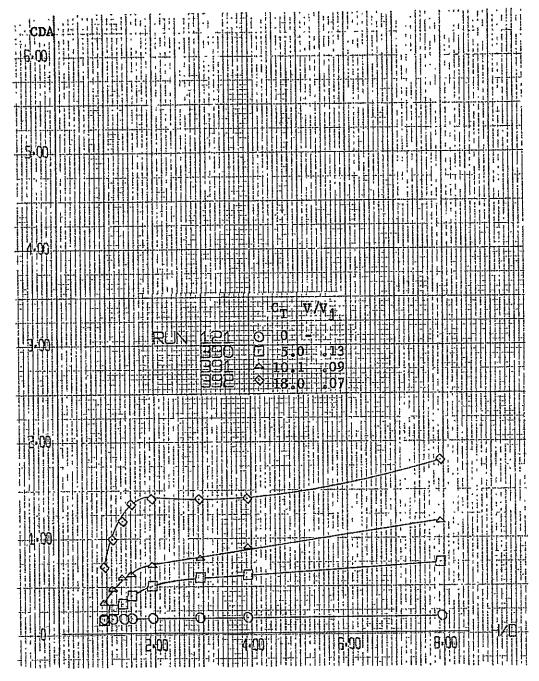


Figure A-50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = 1.2$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = 0^\circ$  (Continued)

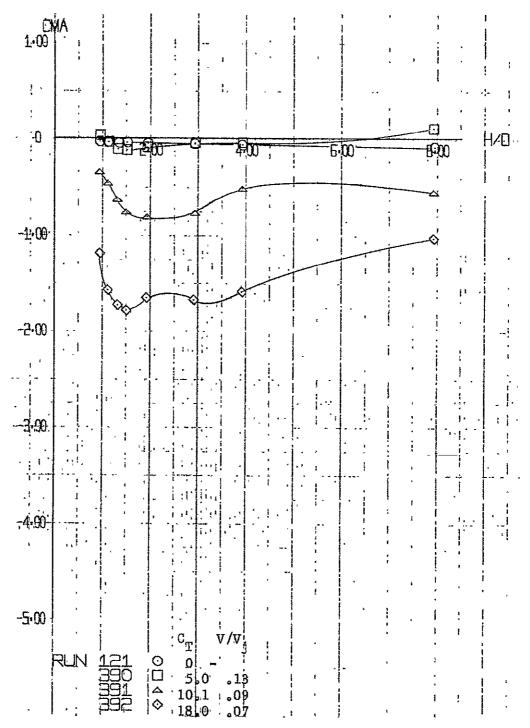


Figure A=50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=1.2$ , Ground Board Configuration 4;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Continued)

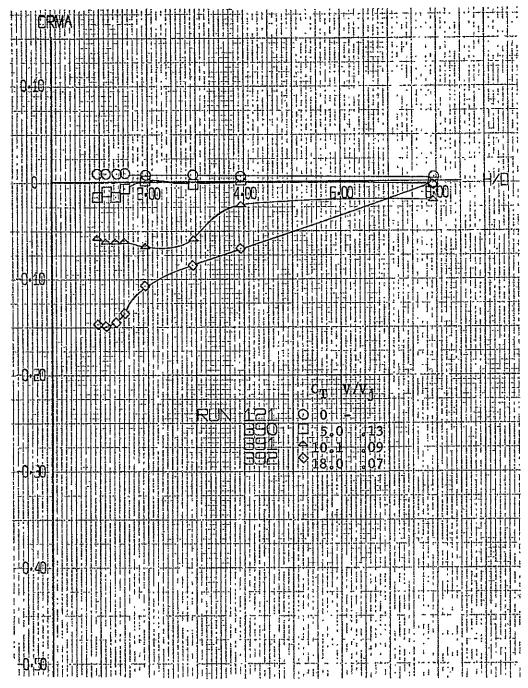


Figure A=50. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = 1.2$ , Ground Board Configuration 4;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

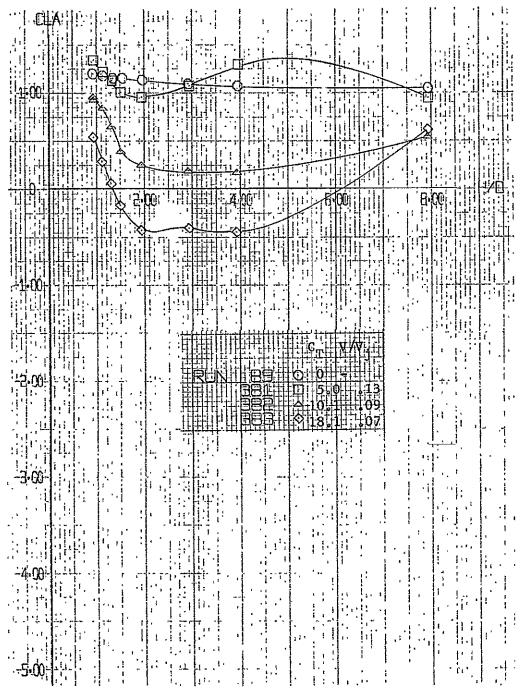


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_{A_0}=1.2$ , Ground Board Configuration 1;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$ 

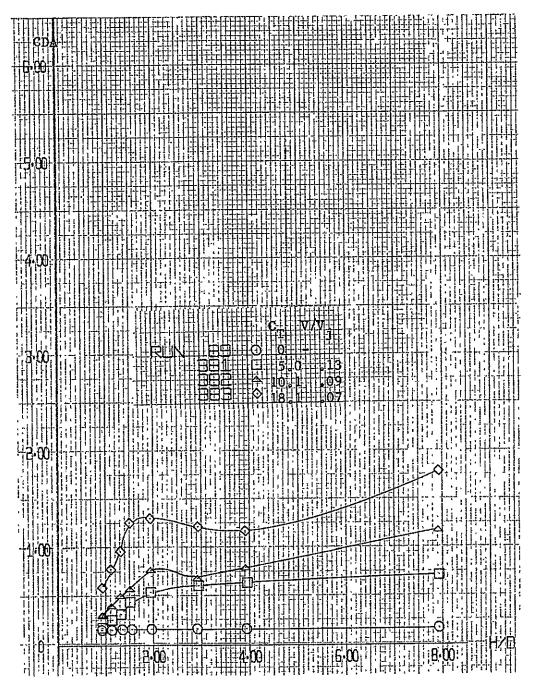


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A=1.2$ , Ground Board Configuration 1;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Continued)

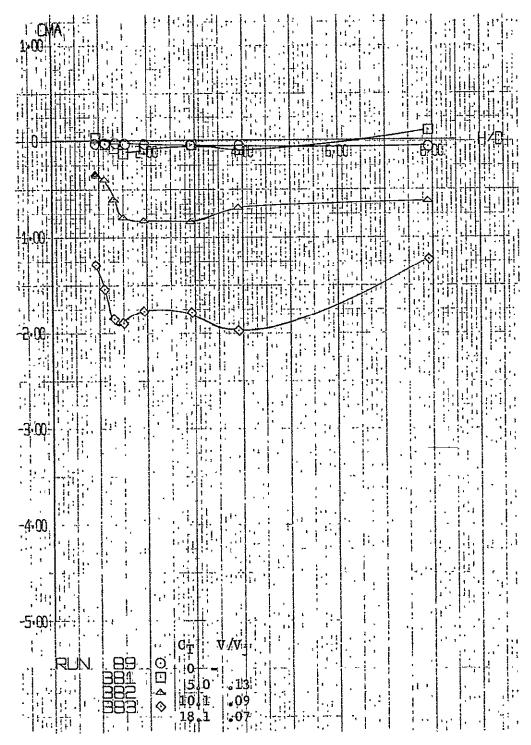


Figure A-51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A = 1.2$ , Ground Board Configuration 1;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

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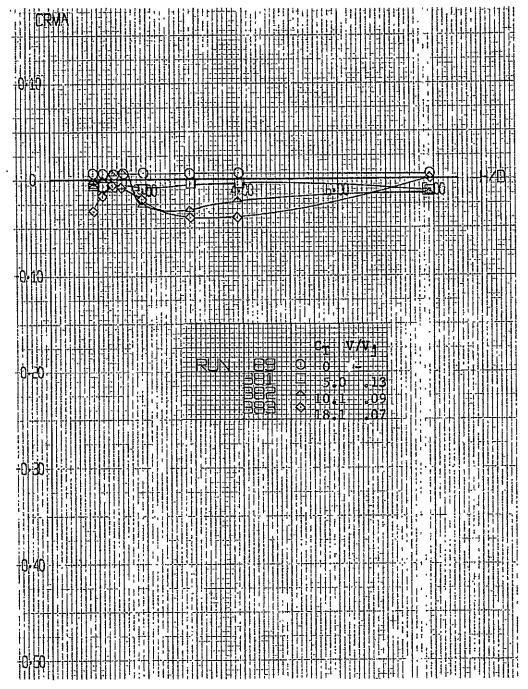


Figure A=51. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_{\rm F}/T_{\rm A}=1.2$ , Ground Board Configuration 1;  $\delta_{\rm N}=90^{\rm O}$ ;  $\alpha=0^{\rm O}$ ;  $\beta=0^{\rm O}$  (Concluded)

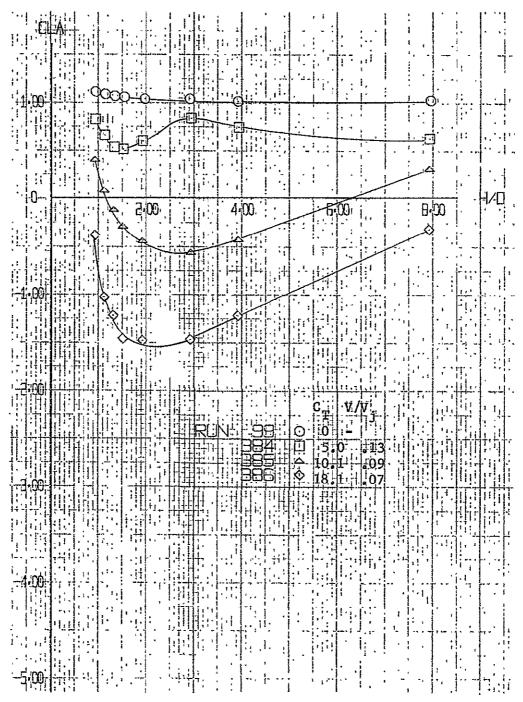


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_{\rm F}/T_{\rm A}=$  1.2, Ground Board Configuration 2;  $\delta_{\rm N}=90^{\rm O}$   $\alpha=0^{\rm O};~\emptyset=0^{\rm O}$ 

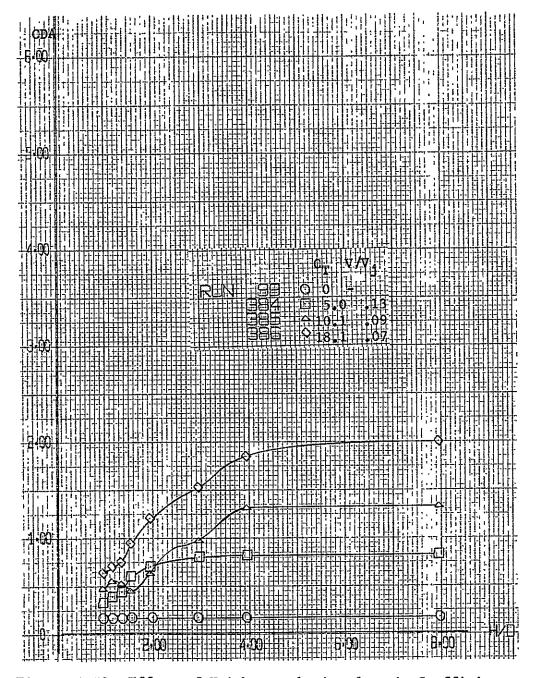


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_{F}/T_{A}=1.2, \text{ Ground Board Configuration 2; } \delta_{N}=90^{\circ}; \\ \alpha=0^{\circ}; \ \emptyset=0^{\circ} \ \text{ (Continued)}$ 

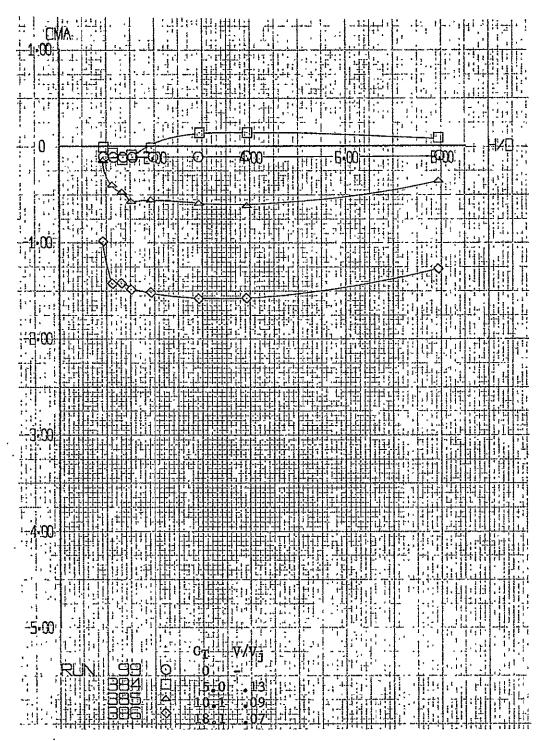


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A=1.2$ , Ground Board Configuration 2;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\phi=0^\circ$  (Continued)

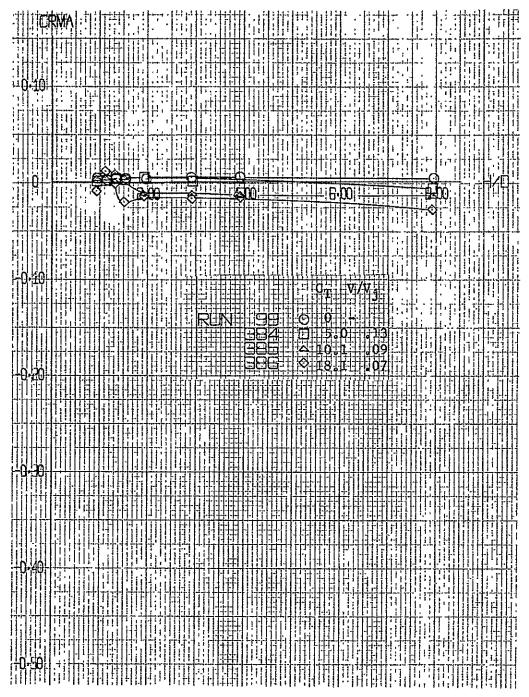


Figure A-52. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A=1.2$ , Ground Board Configuration 2;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Concluded)

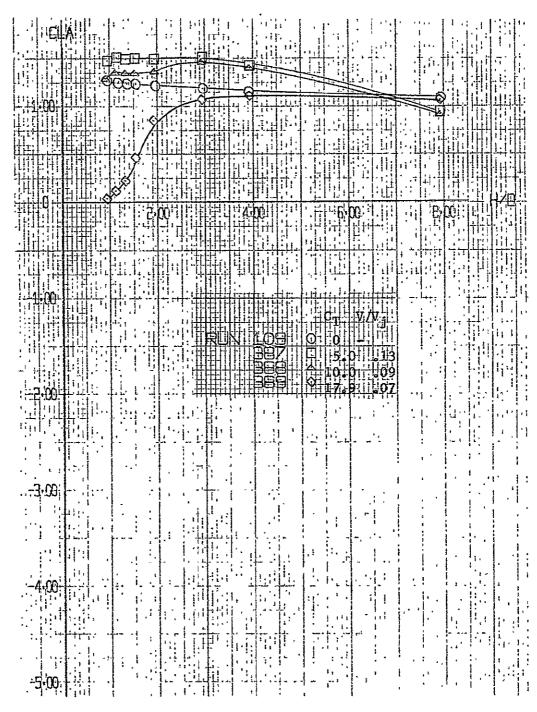


Figure A=53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A=1.2$ , Ground Board Configuration 3;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$ 

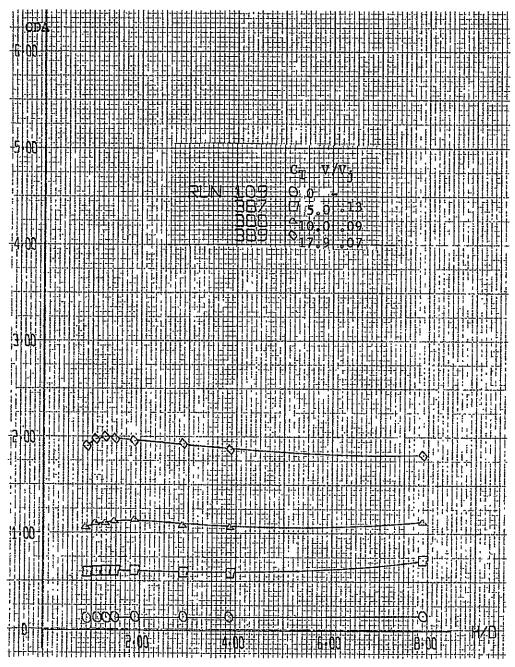


Figure A=53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A = 1.2$ , Ground Board Configuration 3;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\theta = 0^\circ$  (Continued)

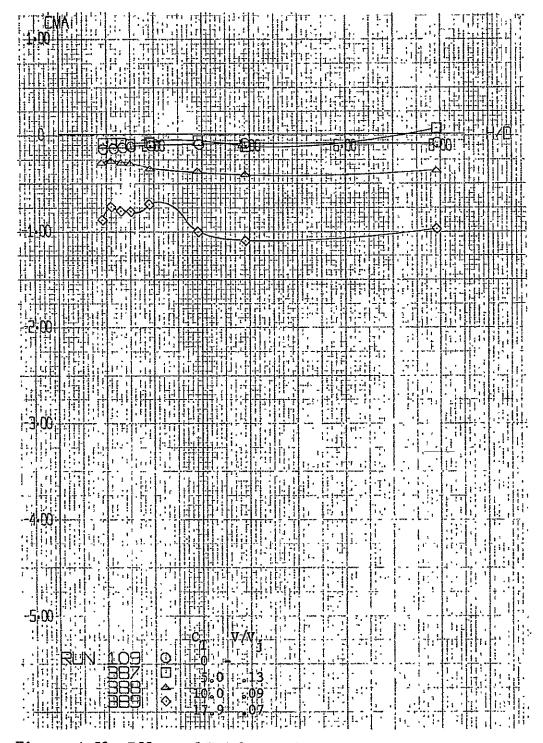


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_{AO} \approx 1.2$ , Ground Board Configuration 3;  $\delta_N = 90^\circ$ ;  $\alpha = 0^\circ$ ;  $\beta = 0^\circ$  (Continued)

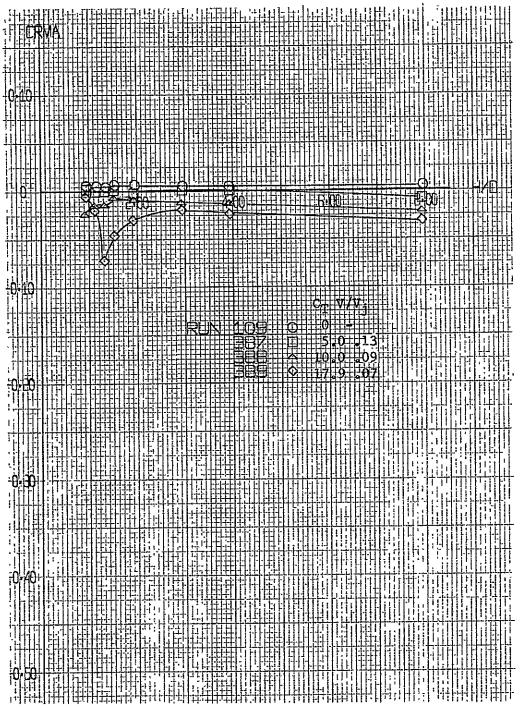


Figure A-53. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Pitch Control In,  $T_F/T_A=1.2$ , Ground Board Configuration 3;  $\delta_N=90^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Concluded)

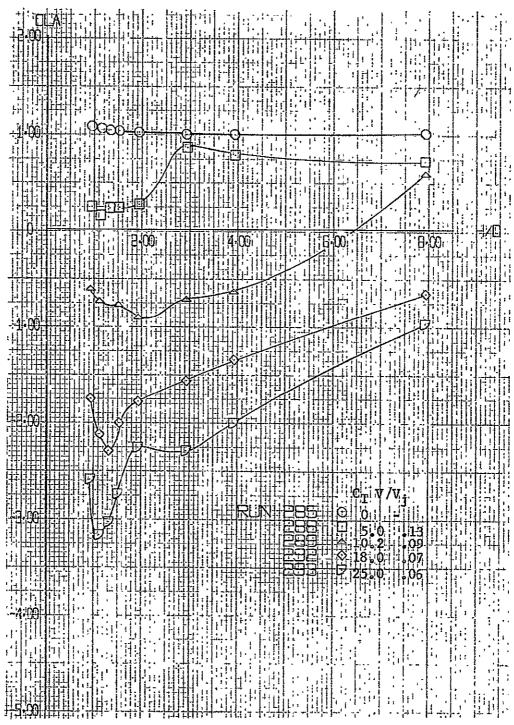


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_N=105^{\circ};~\alpha=0^{\circ};~\emptyset=0^{\circ}$ 

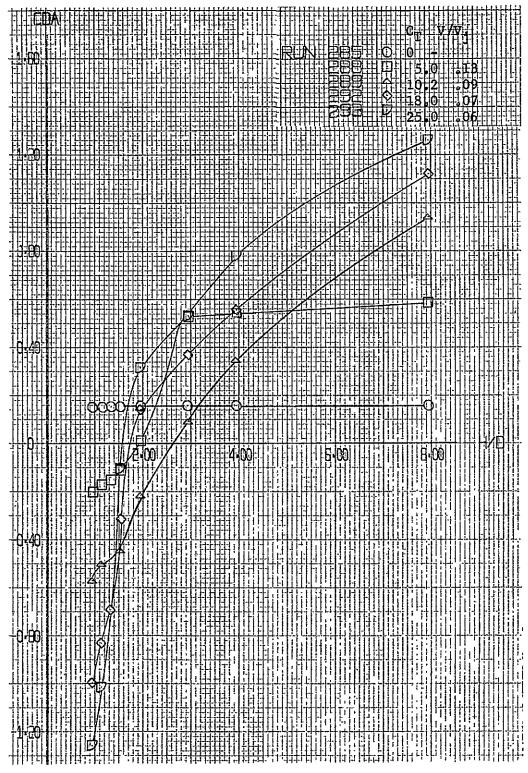


Figure A-54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 2;  $\delta_{\rm N}=105^{\rm O}$ ;  $\alpha=0^{\rm O}$ ;  $\emptyset=0^{\rm O}$  (Continued)

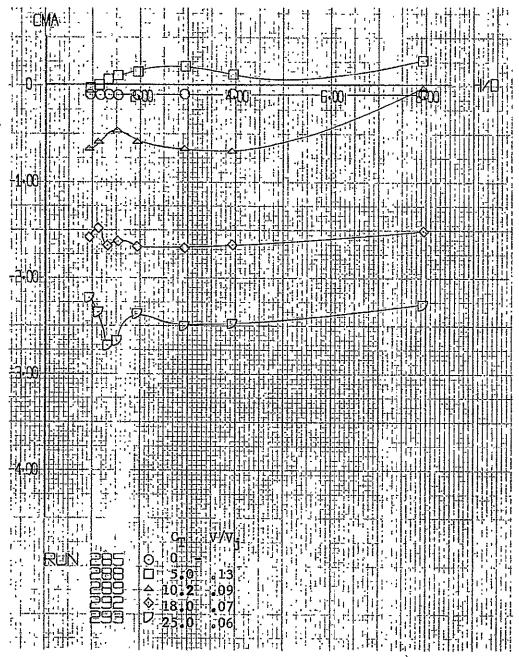


Figure A=54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=105^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

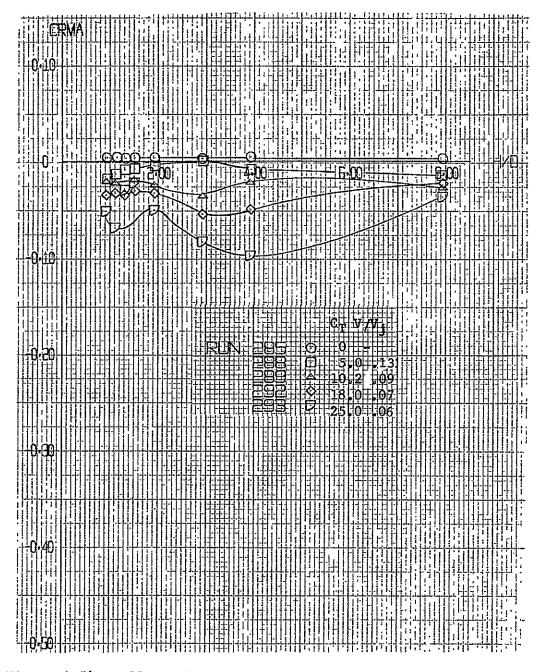


Figure A=54. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}$  =  $105^{\rm O}$ ;  $\alpha$  =  $0^{\rm O}$ ;  $\emptyset$  =  $0^{\rm O}$  (Concluded)

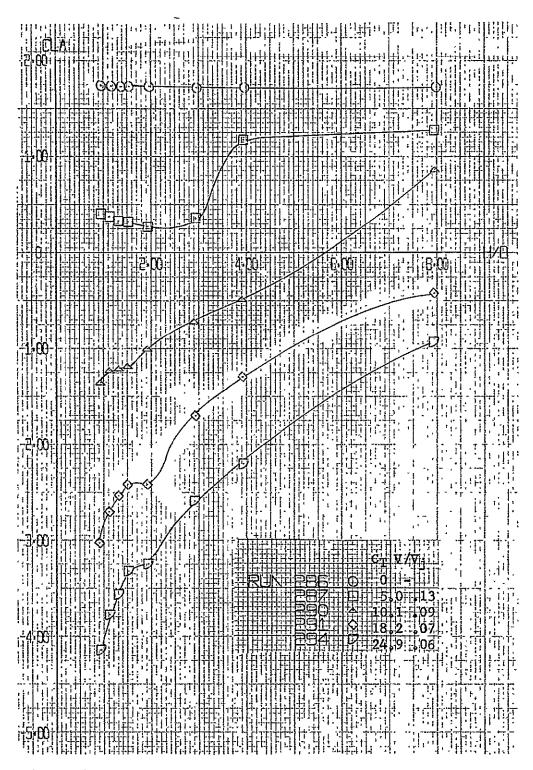


Figure A=55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = 0°

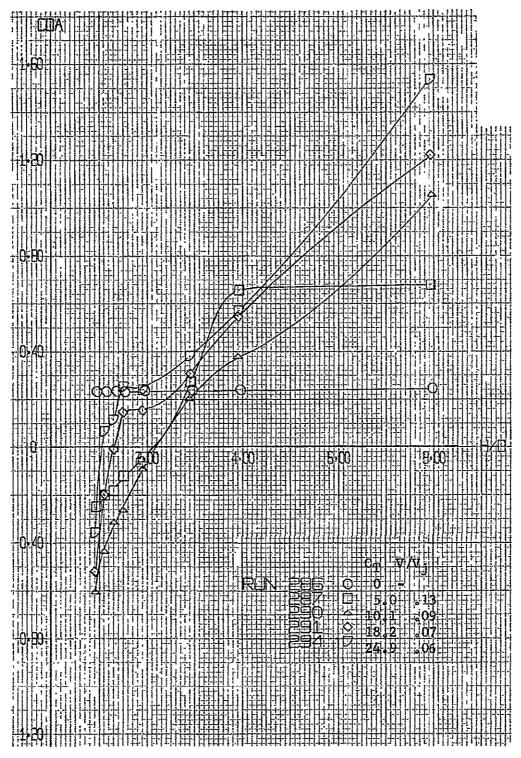


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

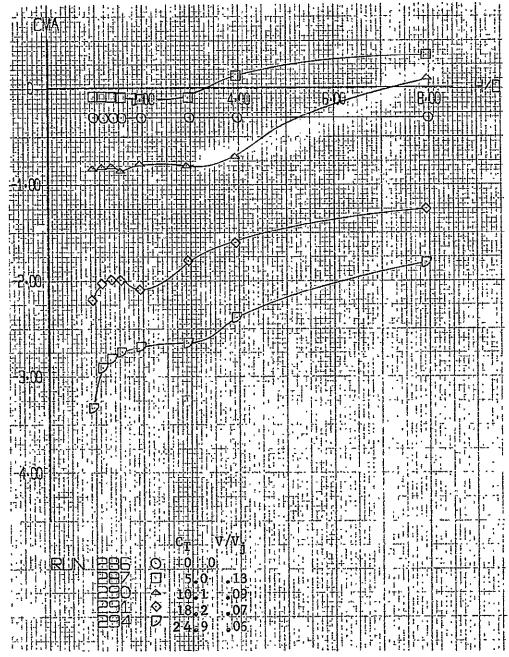


Figure A-55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N}=105^{\rm o};\;\alpha=8^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

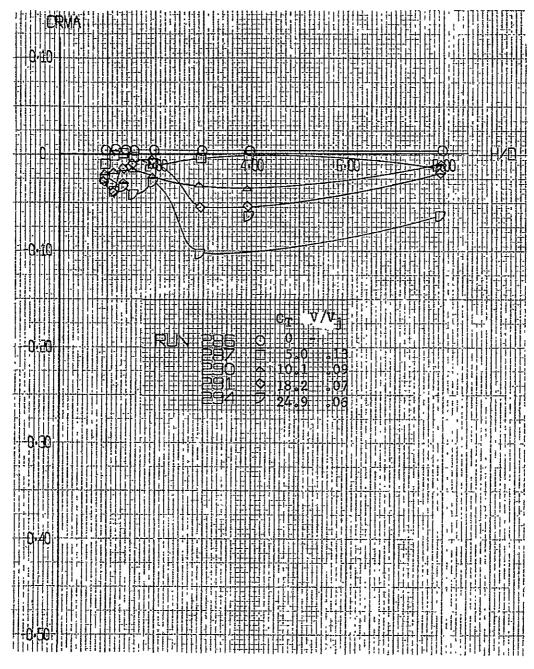


Figure A=55. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 2;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Concluded)

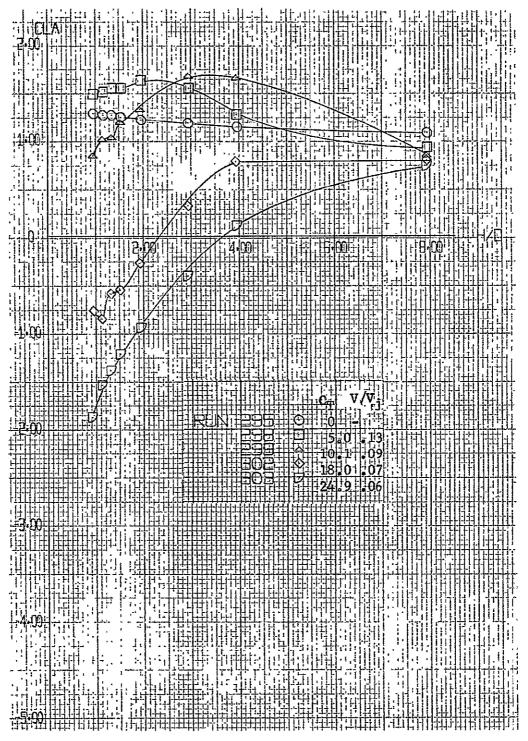


Figure A=56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°

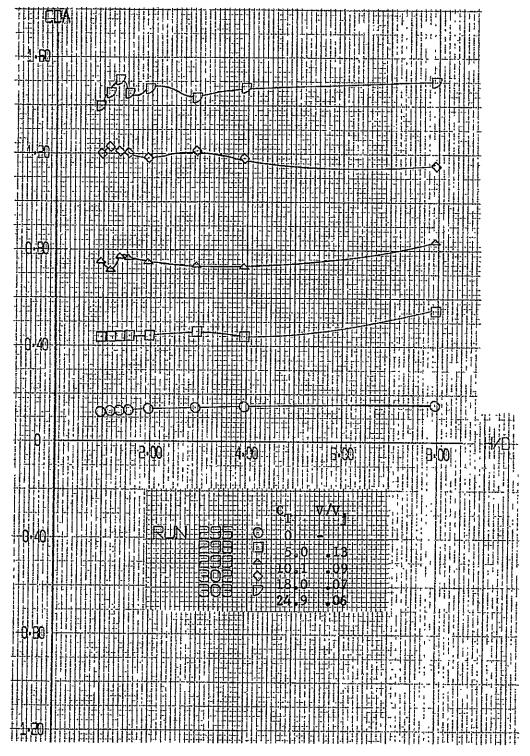


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}=105^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

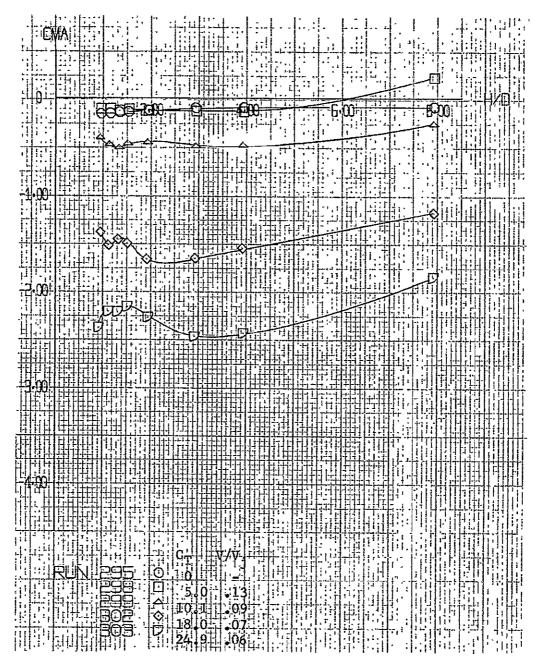


Figure A-56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0° (Continued)

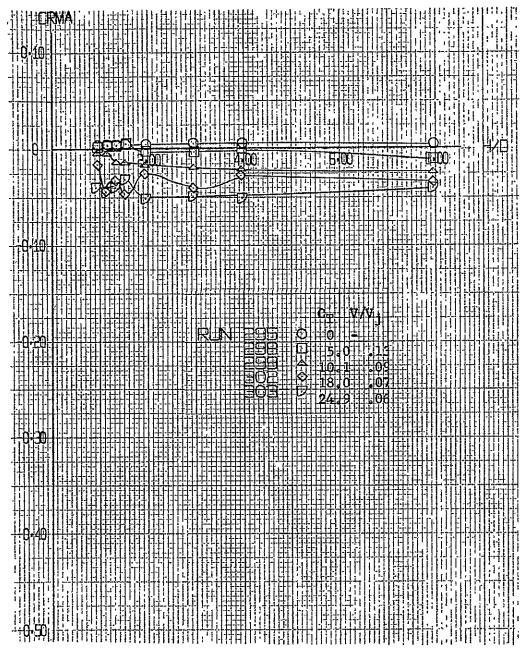


Figure A=56. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

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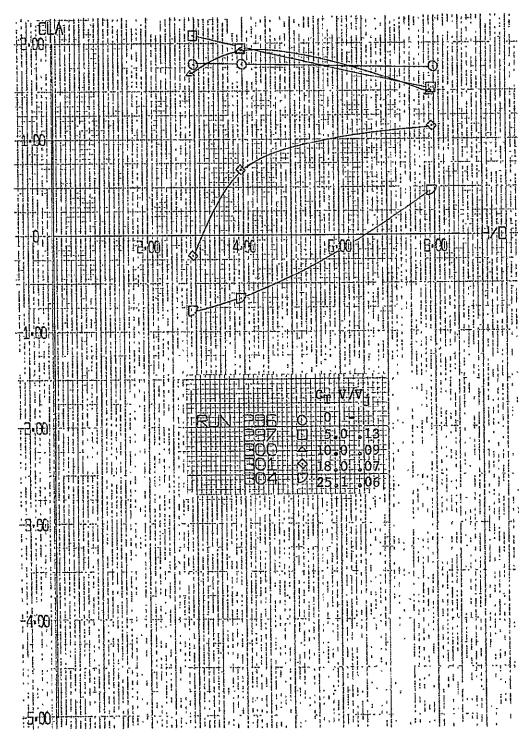


Figure A=57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm M}=105^{\rm o}$ :  $\alpha=8^{\rm o}$ :  $\emptyset=0^{\rm o}$ 

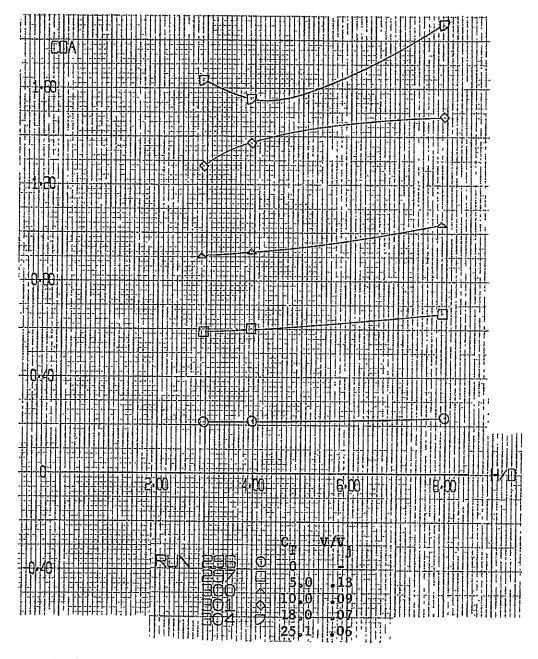


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

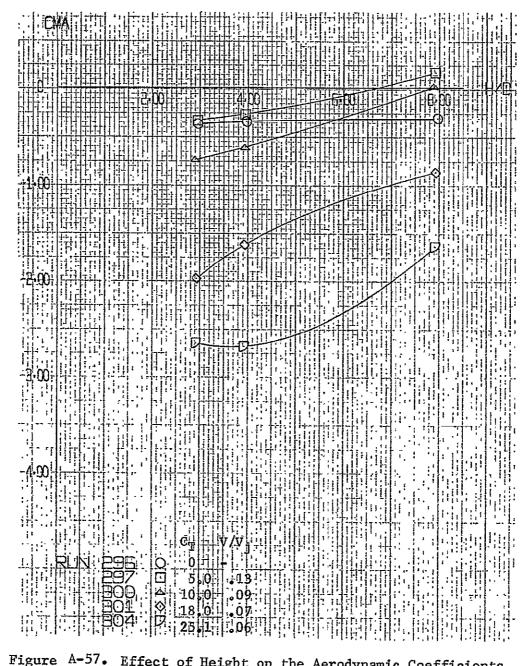


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_N=105^\circ;\;\alpha=8^\circ;\;\emptyset=0^\circ$  (Continued)

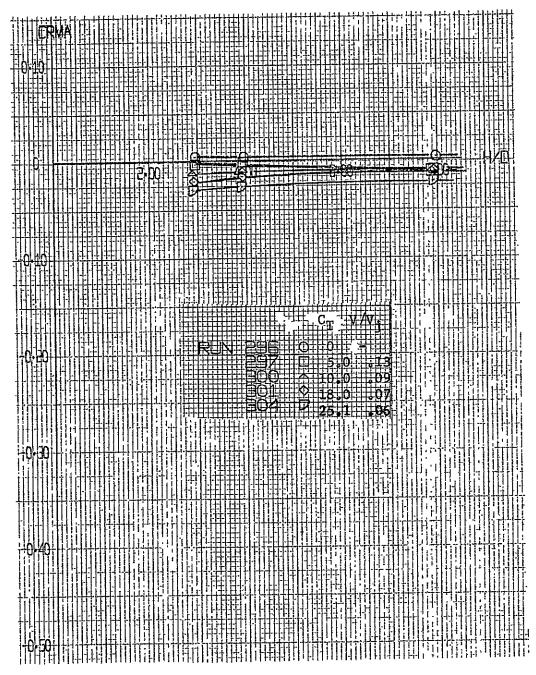


Figure A-57. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 3;  $\delta_{\rm N}=105^{\rm o}$ ;  $\alpha=8^{\rm o}$ ;  $\emptyset=0^{\rm o}$  (Concluded)

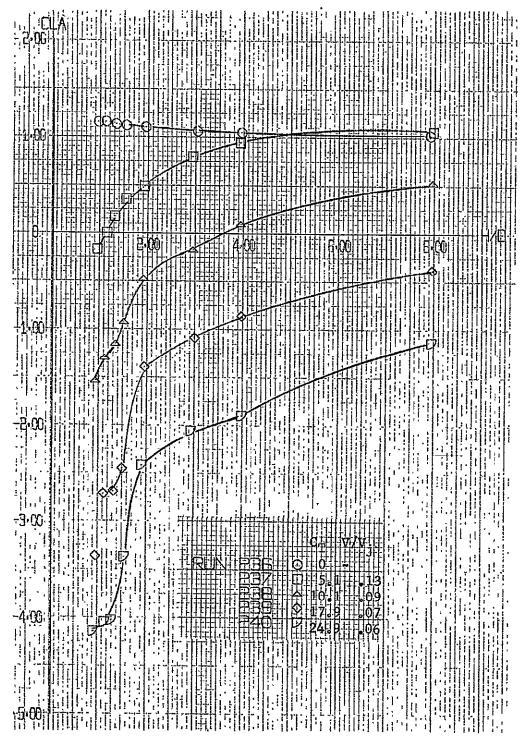


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°; Ø = -10°

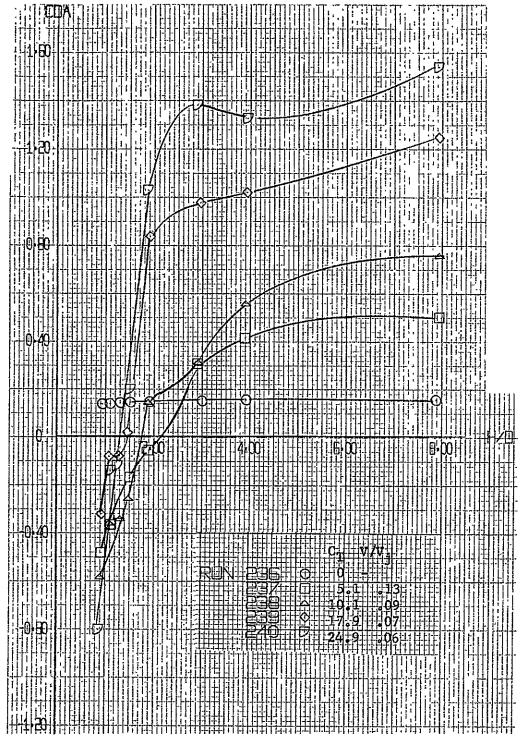


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

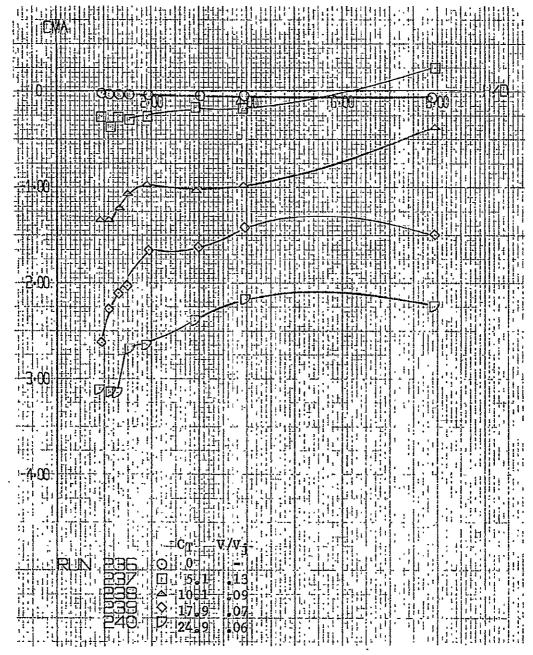


Figure A=58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

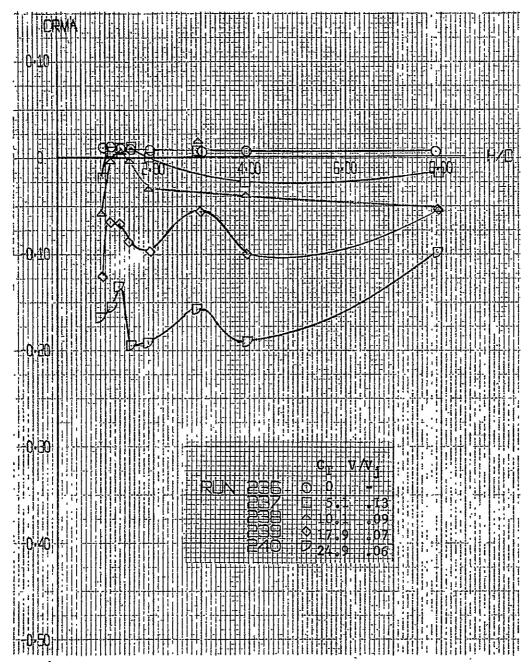


Figure A-58. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=105^{\rm O};\;\alpha=0^{\rm O};\;\emptyset=-10^{\rm O}\;$  (Concluded)

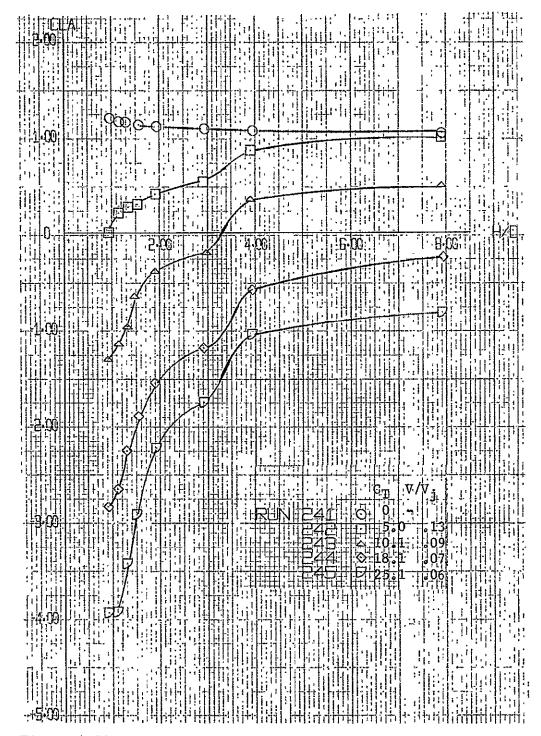


Figure A=59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 10°



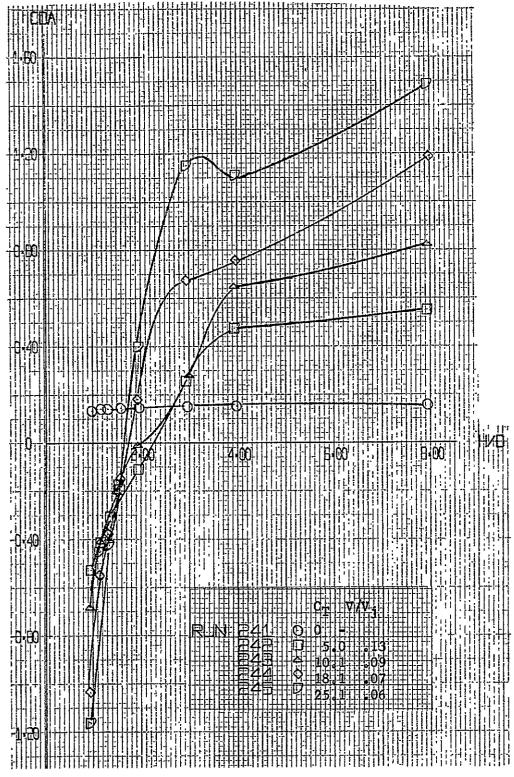


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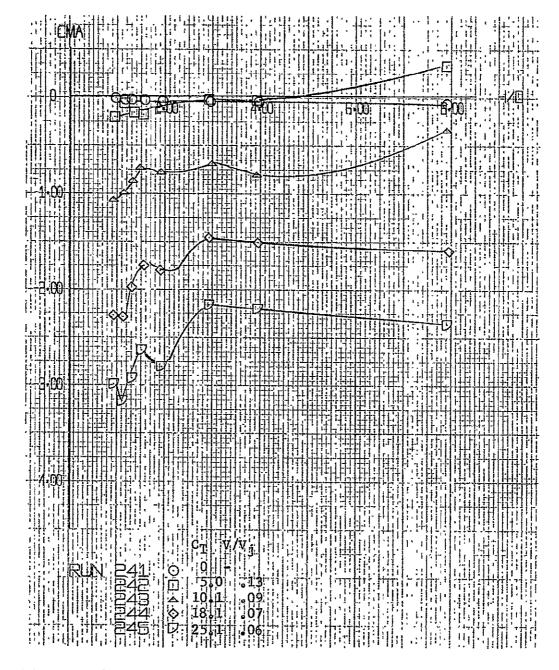


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Continued)

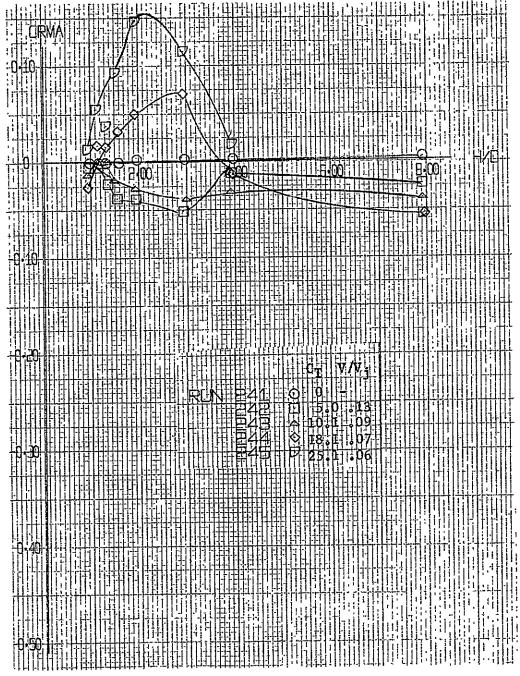


Figure A-59. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Concluded)

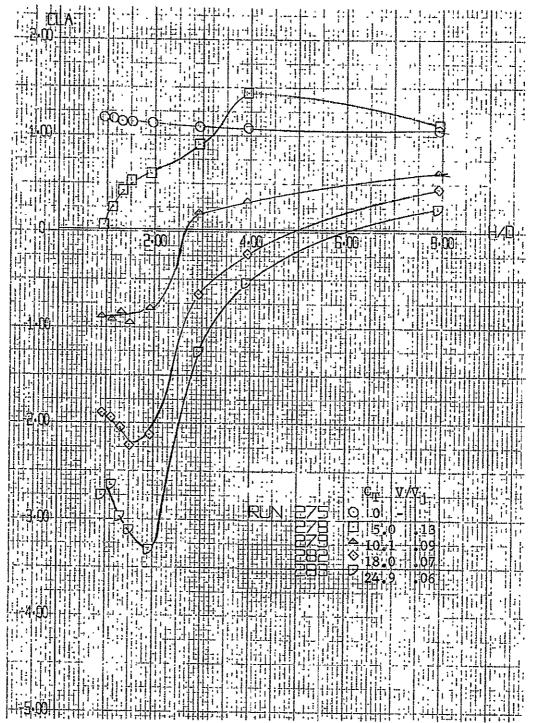


Figure A=60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 0°

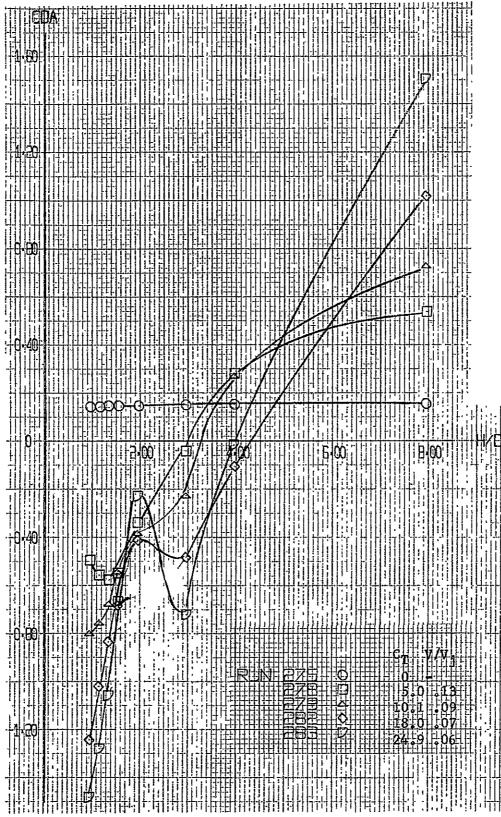


Figure A-60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1;  $\delta_{\rm N}=105^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=0^{\rm o}$  (Continued)

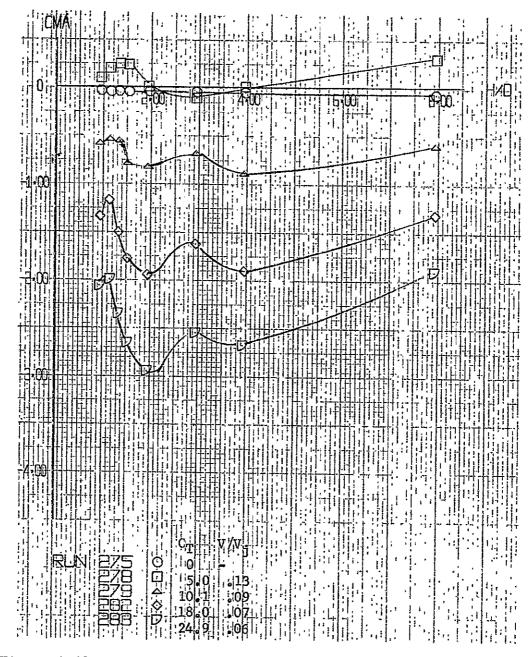


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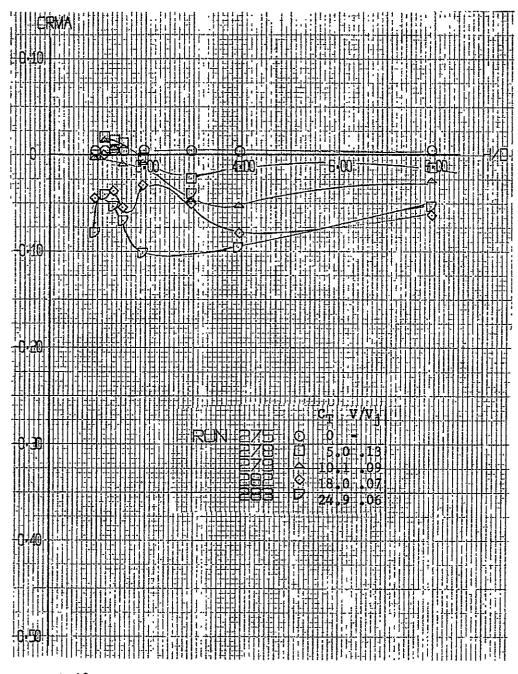


Figure A=60. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

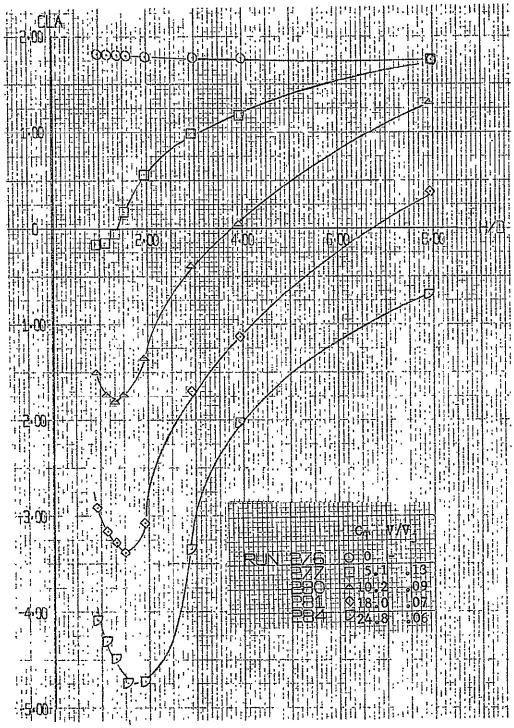


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = 0°

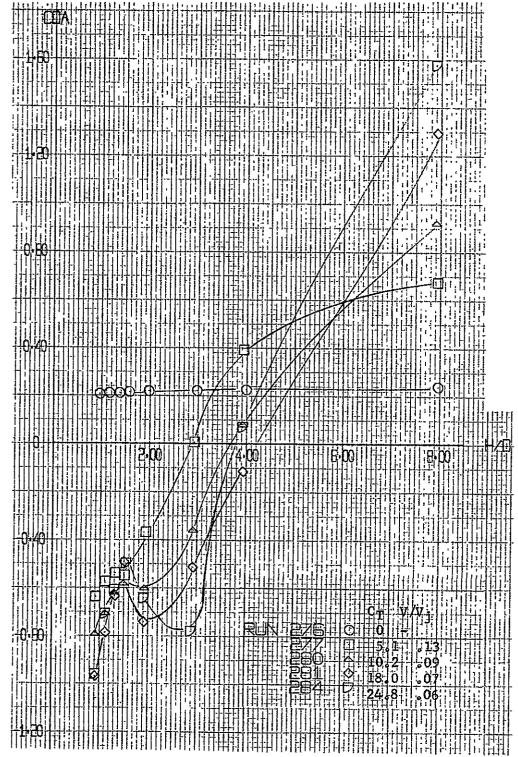


Figure A-61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N}=105^{\rm o};\;\alpha=8^{\rm o};\;\emptyset=0^{\rm o}$  (Continued):



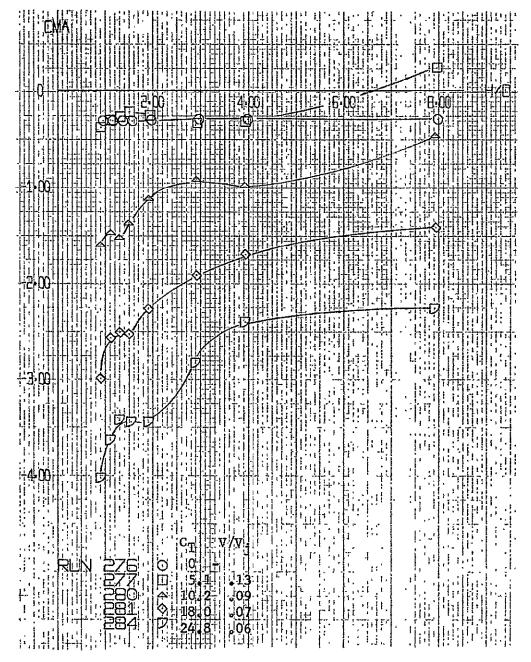


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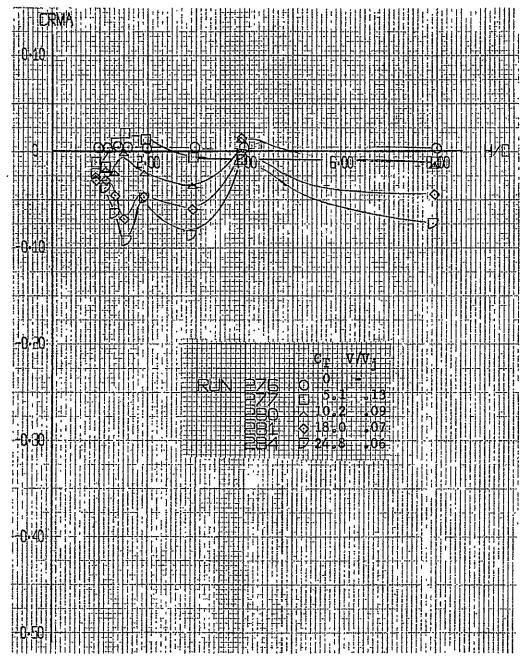


Figure A=61. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$  (Concluded)

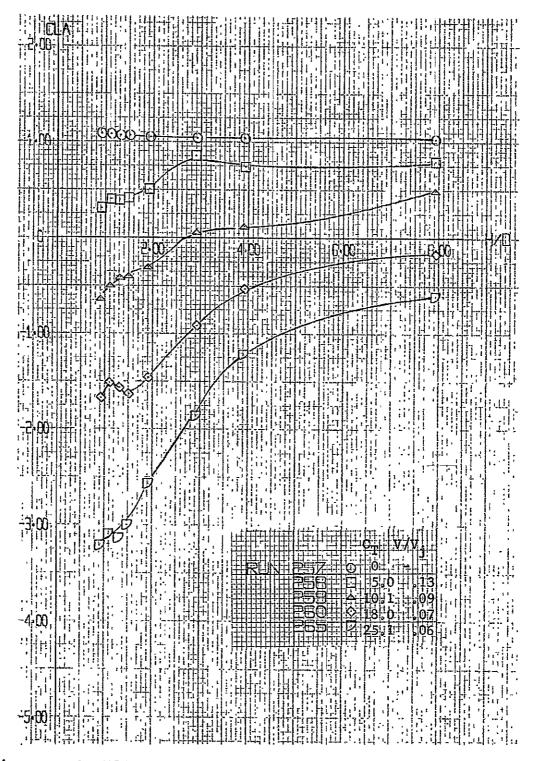


Figure A=62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -1°

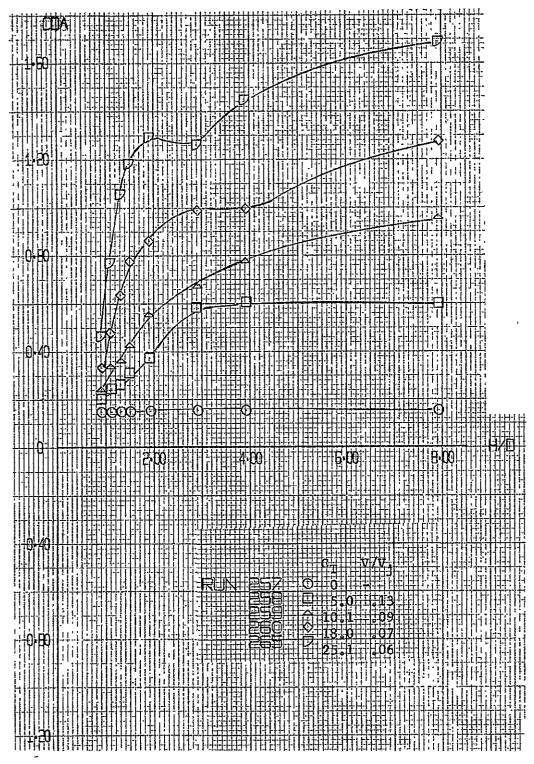


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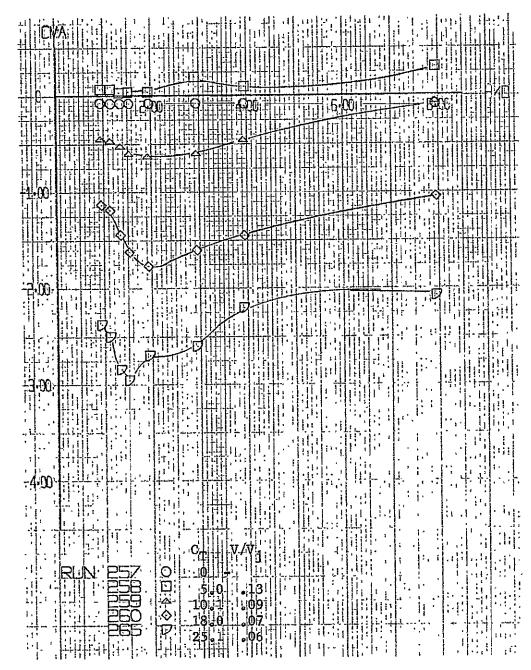


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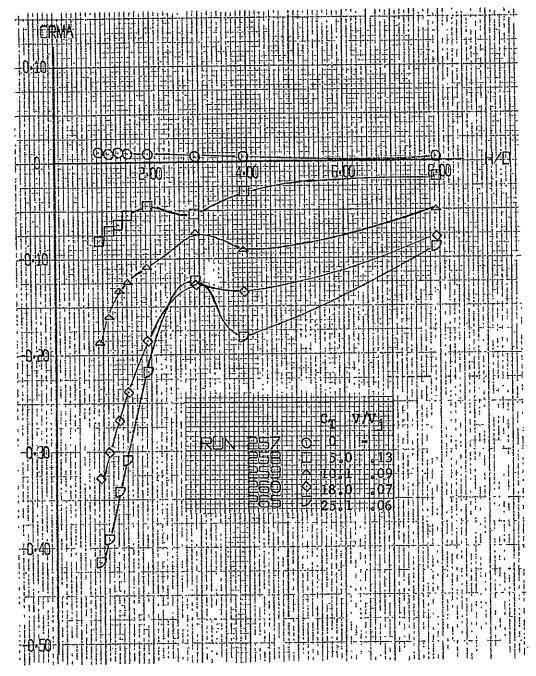


Figure A-62. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=105^{\circ};\;\alpha=0^{\circ};\;\emptyset=-1^{\circ}$  (Concluded)

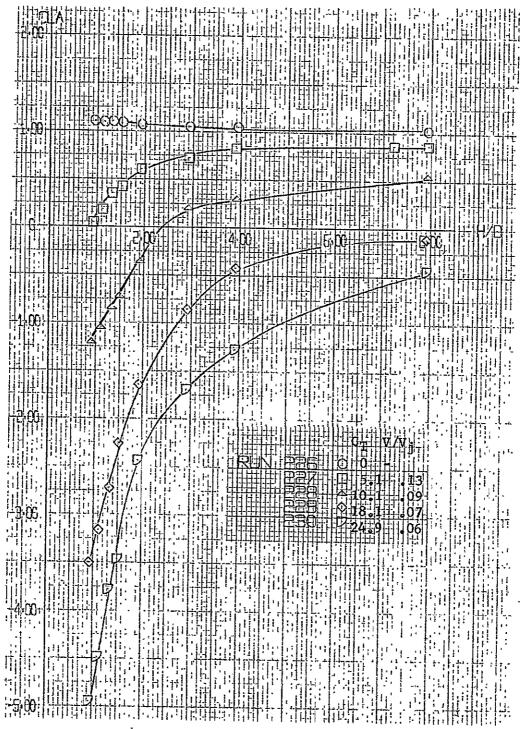


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=105^{\rm o};~\alpha=0^{\rm o};~\emptyset=-10^{\rm o}$ 

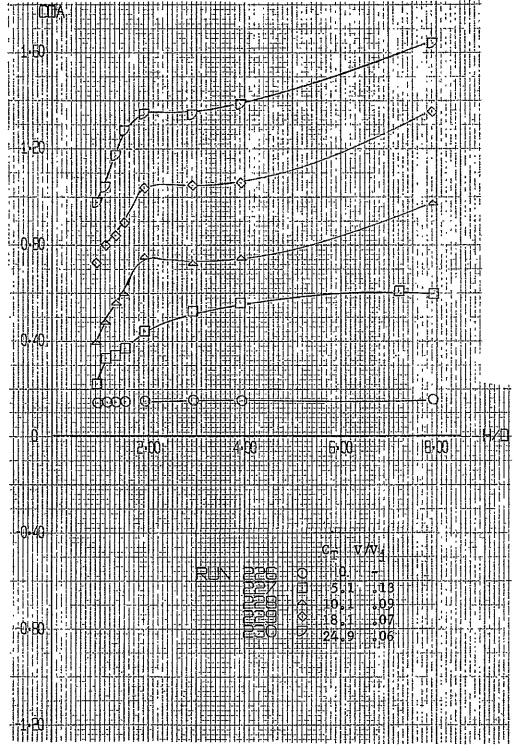


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

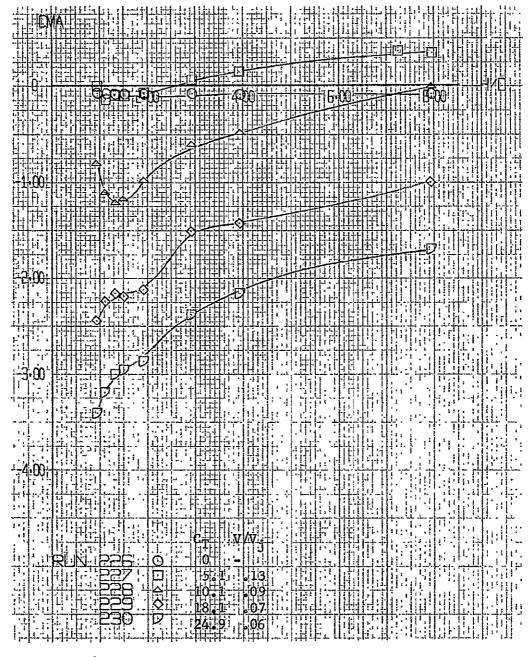


Figure A-63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}=105^{\circ};\;\alpha=0^{\circ};\;\emptyset=-10^{\circ}$  (Continued)

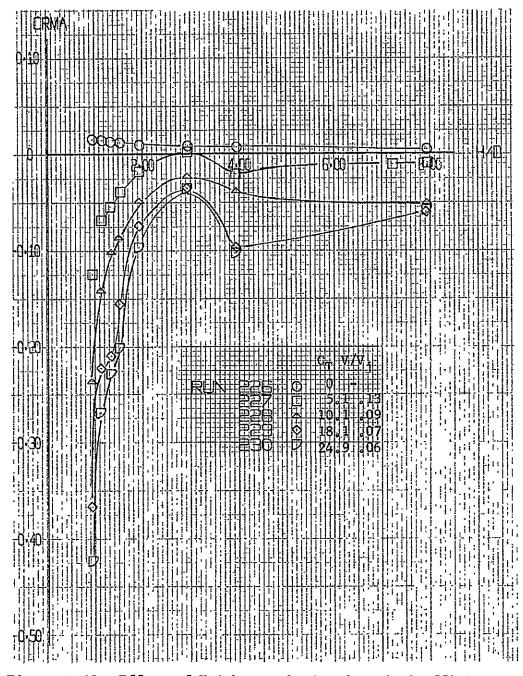


Figure A=63. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Concluded)

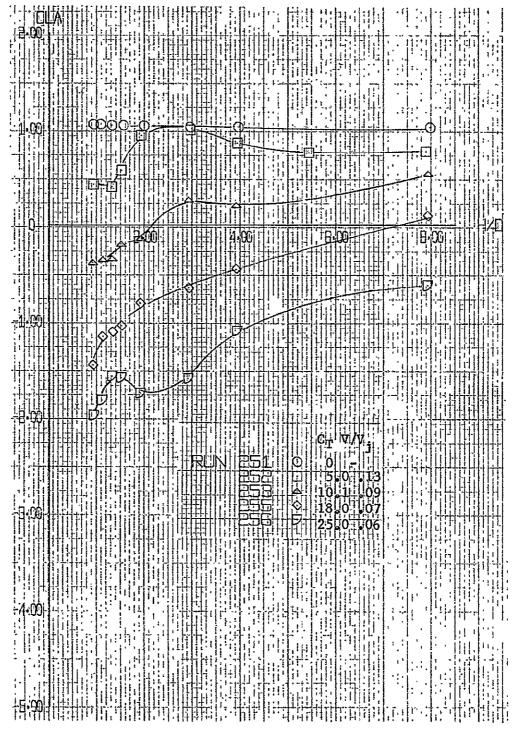


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 10°

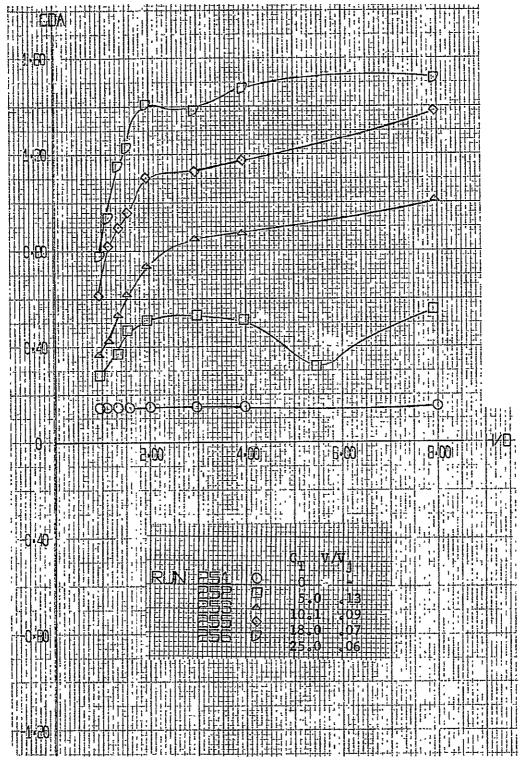


Figure A-64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_N=105^\circ;~\alpha=0^\circ;~\emptyset=10^\circ$  (Continued)

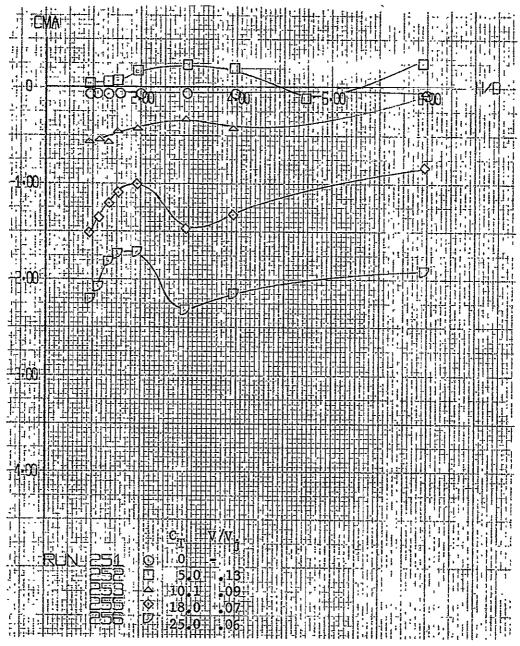


Figure A=64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_N = 105^\circ$ :  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)

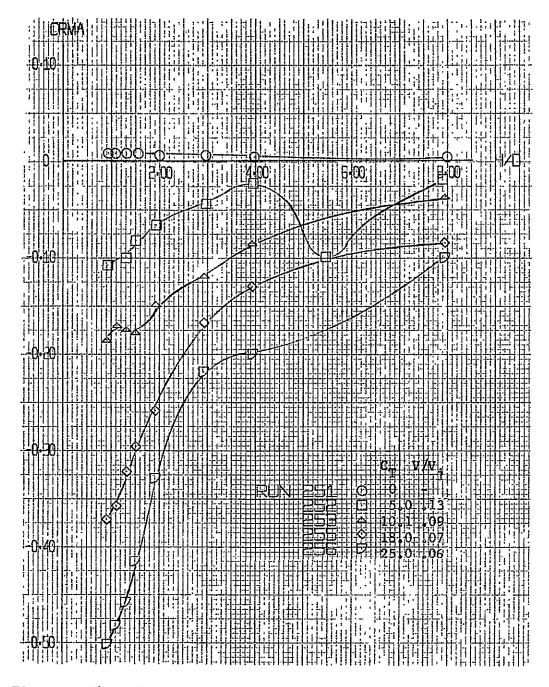


Figure A=64. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = 10° (Concluded)

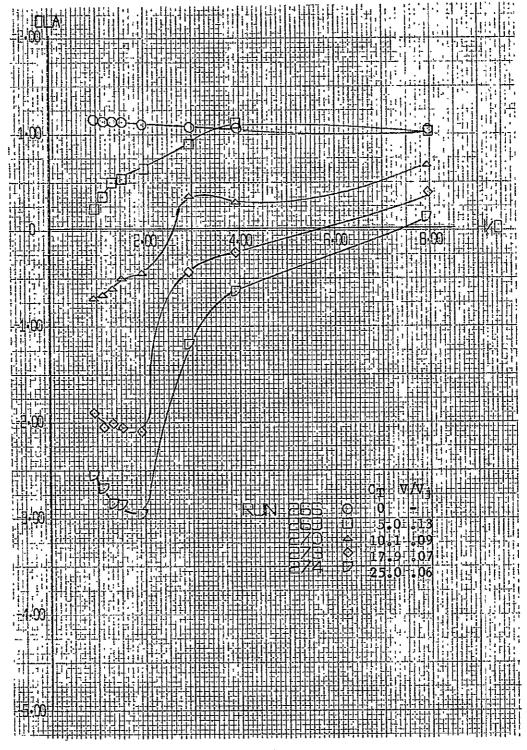


Figure A=65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\rm o};~\alpha=0^{\rm o};~\emptyset=-1^{\rm o}$ 

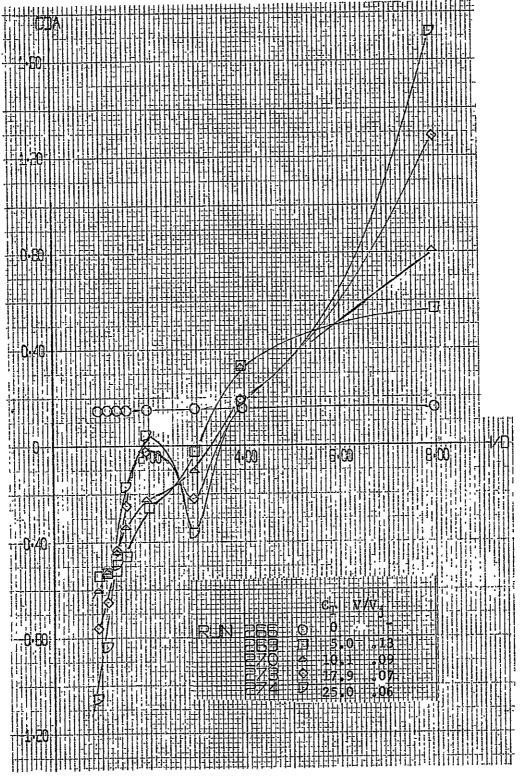


Figure A=65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=-1^{\circ}$  (Continued)

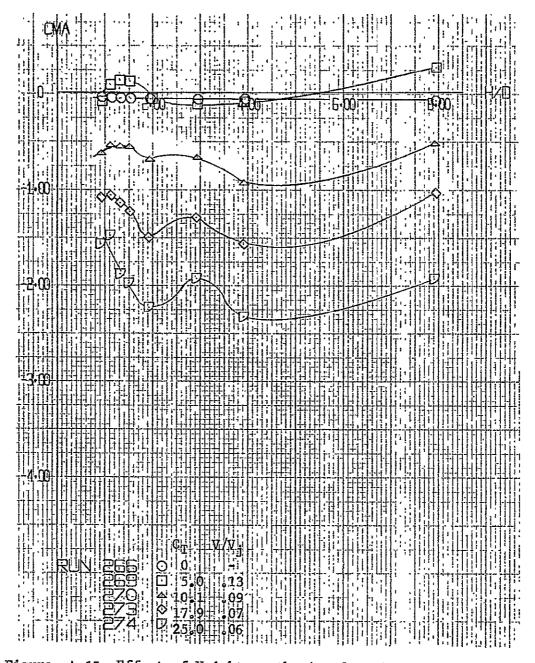
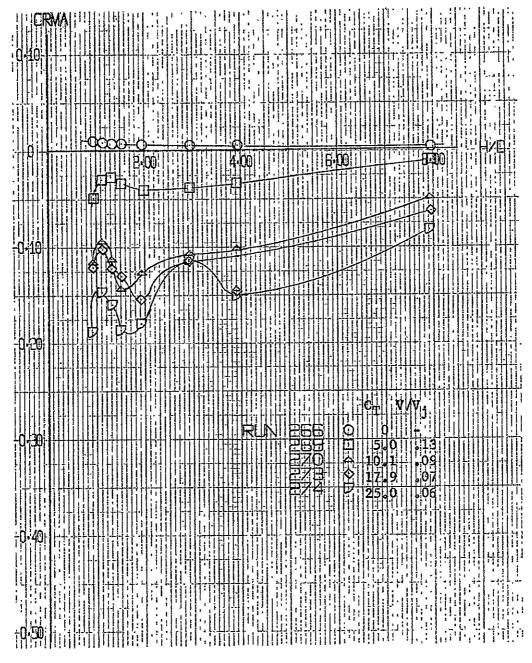


Figure A=65. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\rm O}$ ;  $\alpha=0^{\rm O}$ ;  $\emptyset=-1^{\rm O}$  (Continued)



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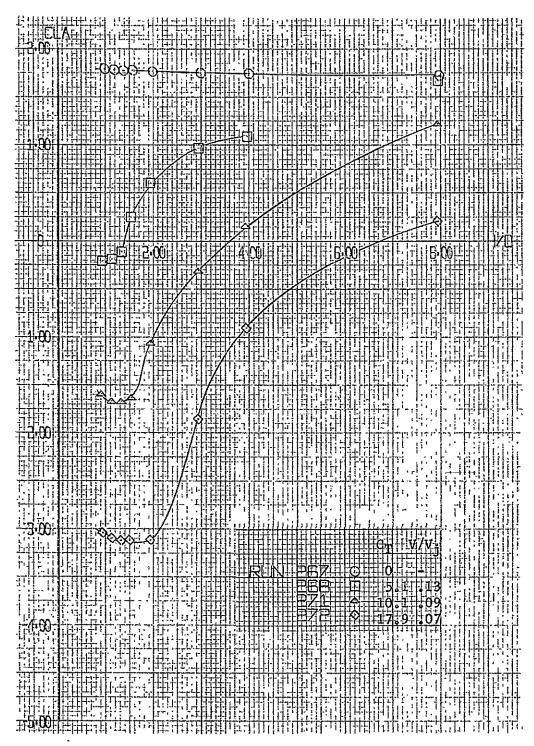


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_N = 105^\circ$ ;  $\alpha = 8^\circ$ ;  $\emptyset = -1^\circ$ 

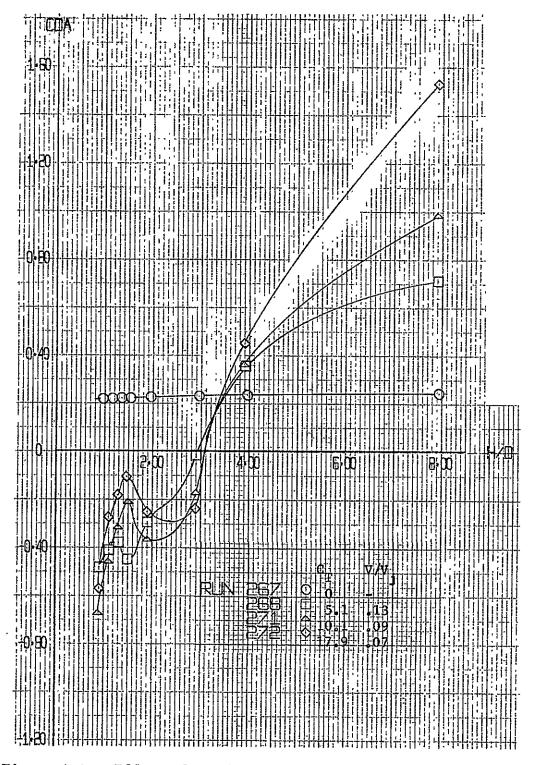


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = -1° (Continued)

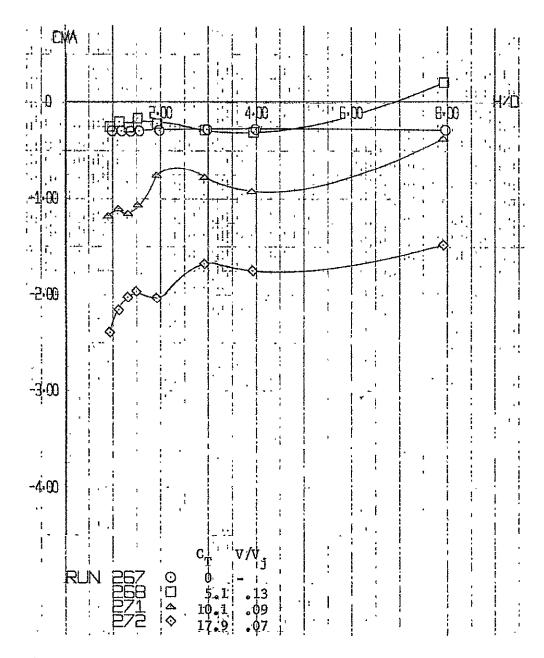


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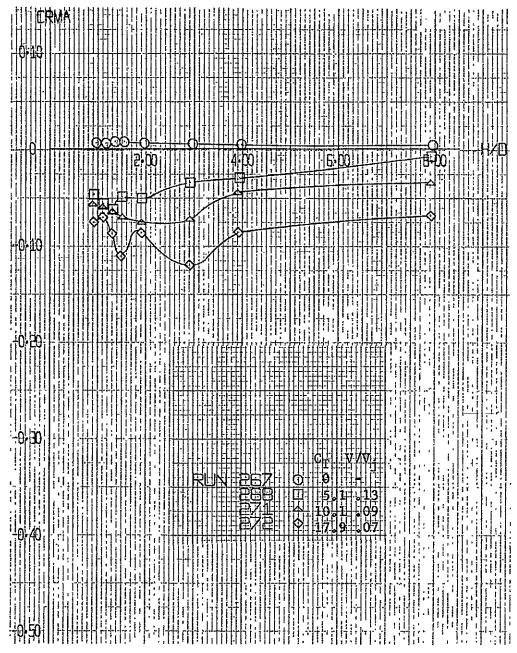


Figure A-66. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 8°;  $\emptyset$  = -1° (Concluded)

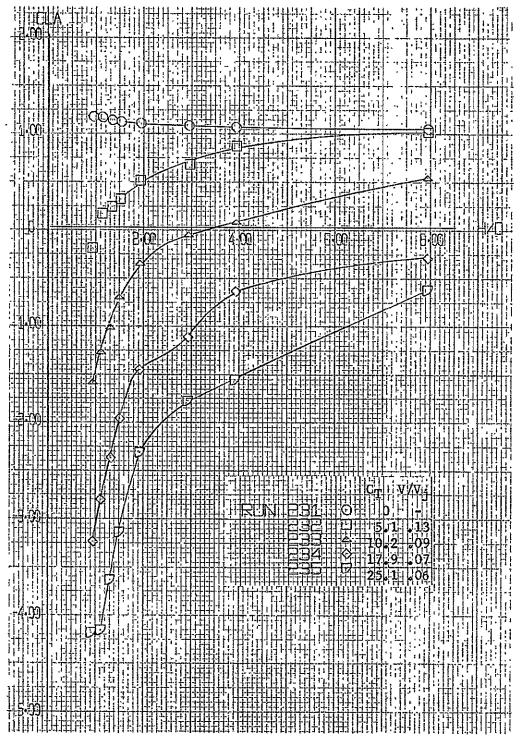


Figure A=67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_N = 105^{\rm o};~\alpha=0^{\rm o};~\emptyset=-10^{\rm o}$ 

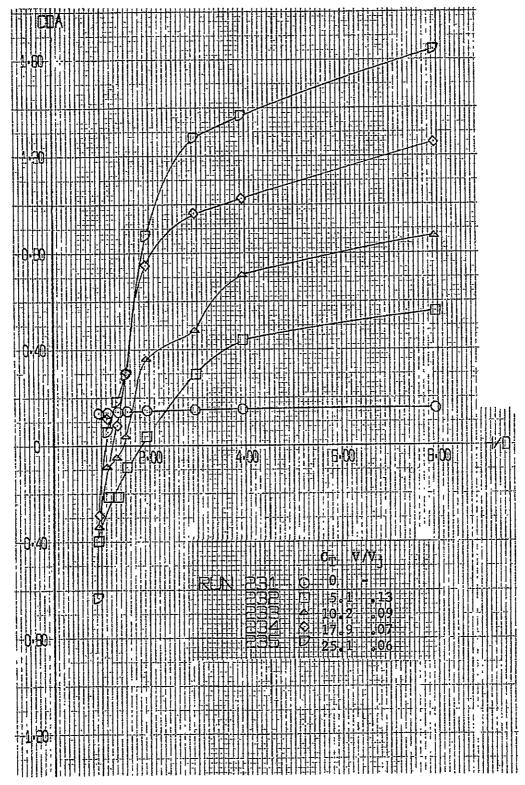


Figure A-67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=-10^{\rm o}$  (Continued)

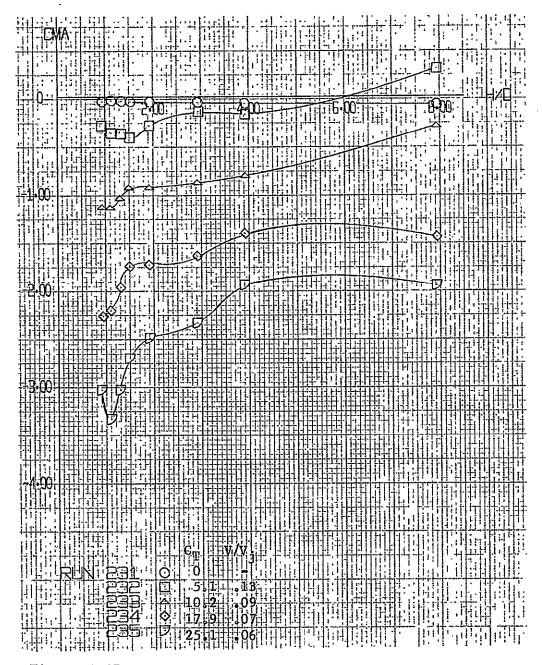


Figure A=67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Continued)

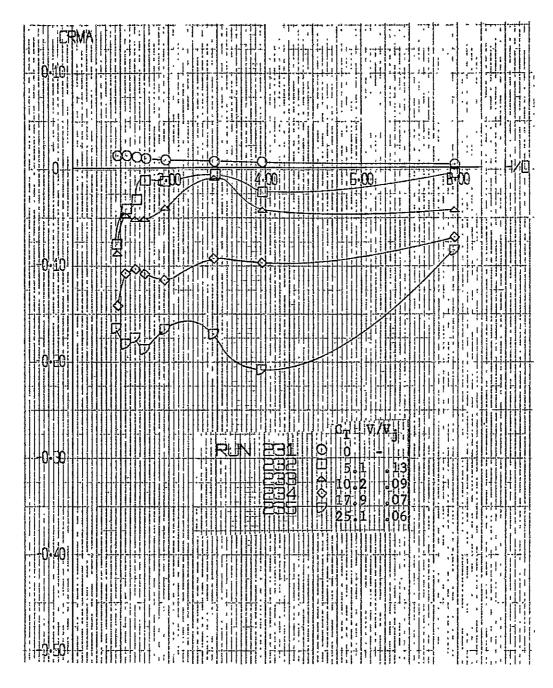


Figure A=67. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°;  $\emptyset$  = -10° (Concluded)

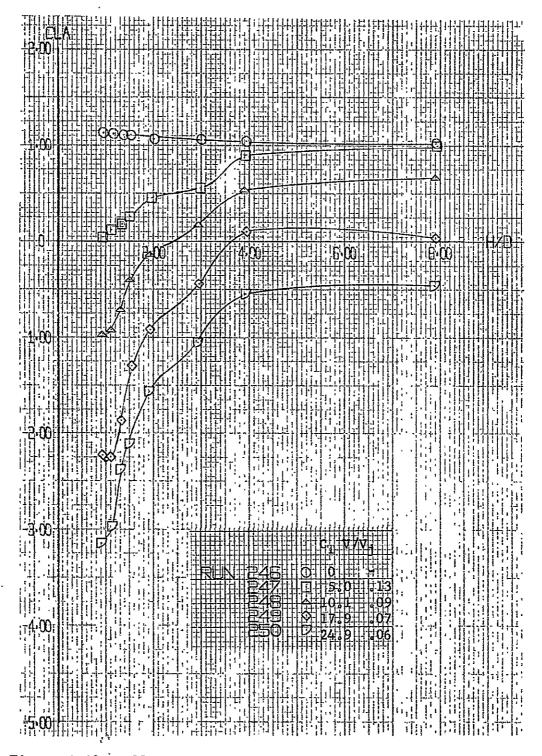


Figure A=68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\rm O}$ ;  $\alpha=0^{\rm O}$ ;  $\beta=10^{\rm O}$ 

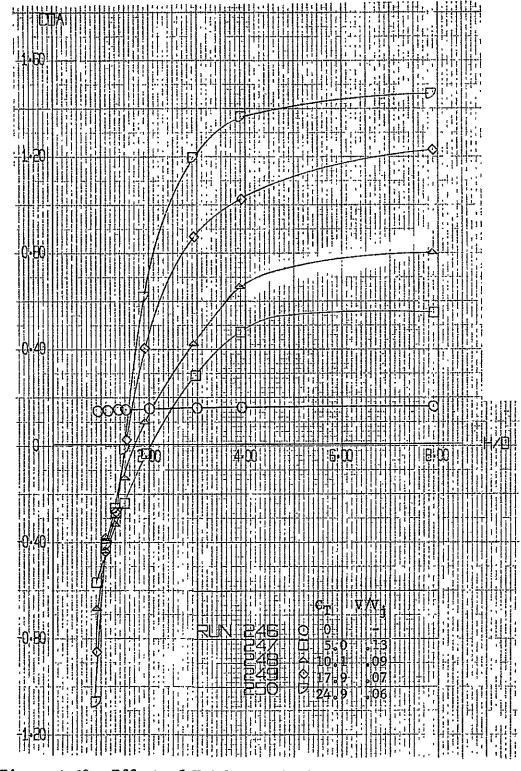


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\rm o};\;\alpha=0^{\rm o};\;\emptyset=10^{\rm o}$  (Continued)

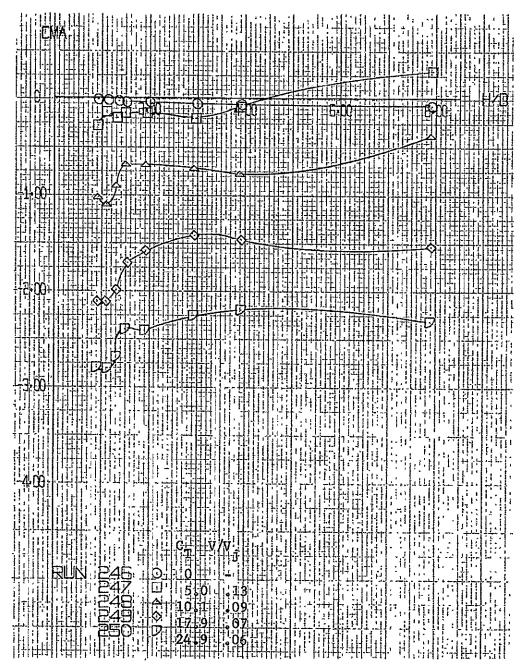


Figure A=68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}=105^{\circ};\;\alpha=0^{\circ};\;\emptyset=10^{\circ}$  (Continued)

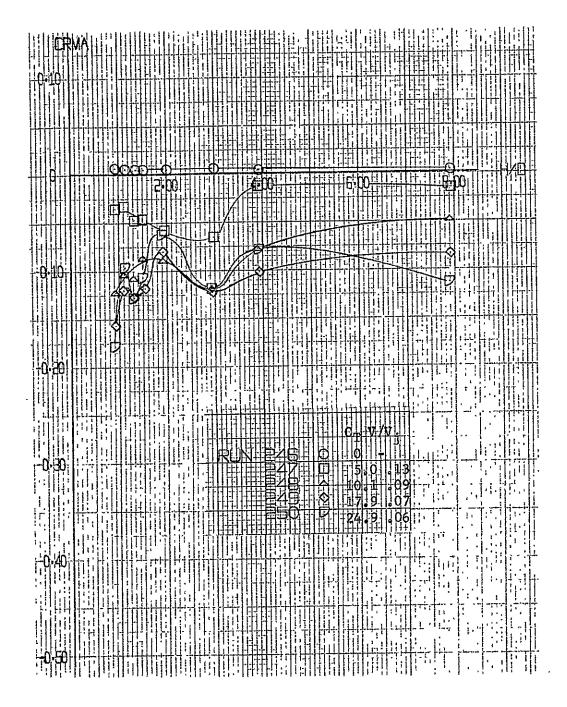


Figure A-68. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N}$  = 105°;  $\alpha$  = 0°; Ø = 10° (Concluded)

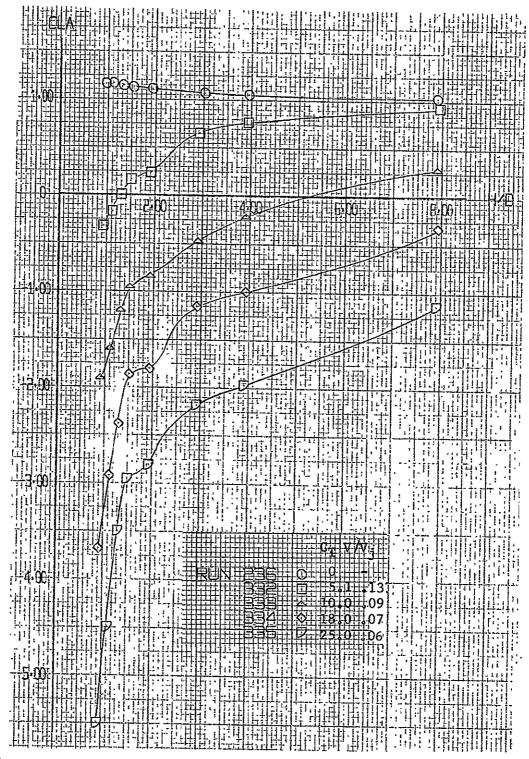
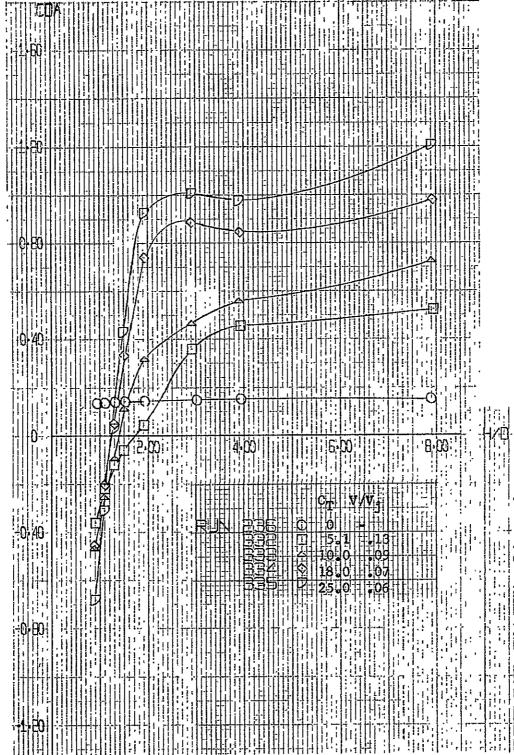


Figure A=69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_{N}=105^{\circ}$ ;  $\alpha=0^{\circ}$ ;  $\beta=-10^{\circ}$ 



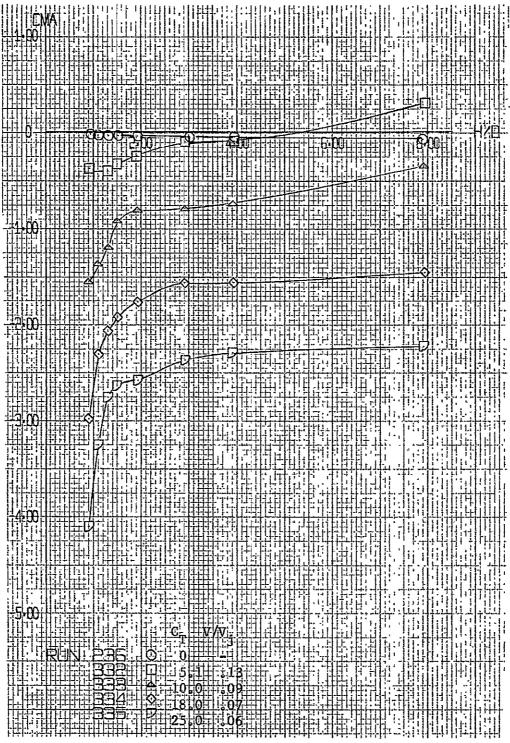


Figure A=69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=-10^\circ$  (Continued)

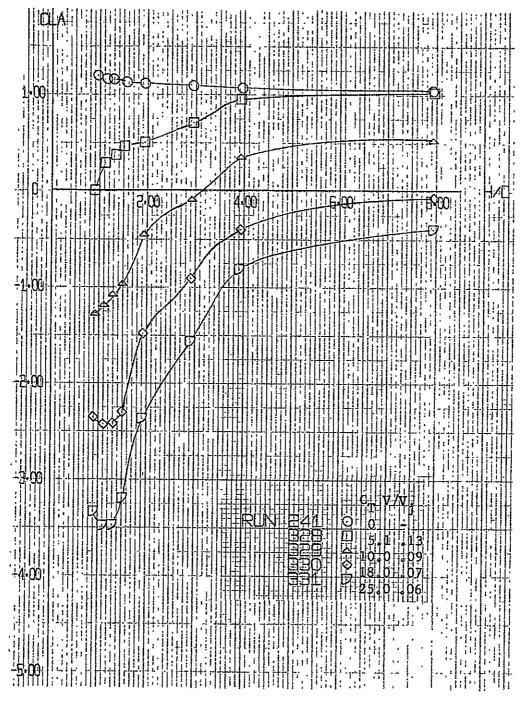


Figure A-69. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Concluded)

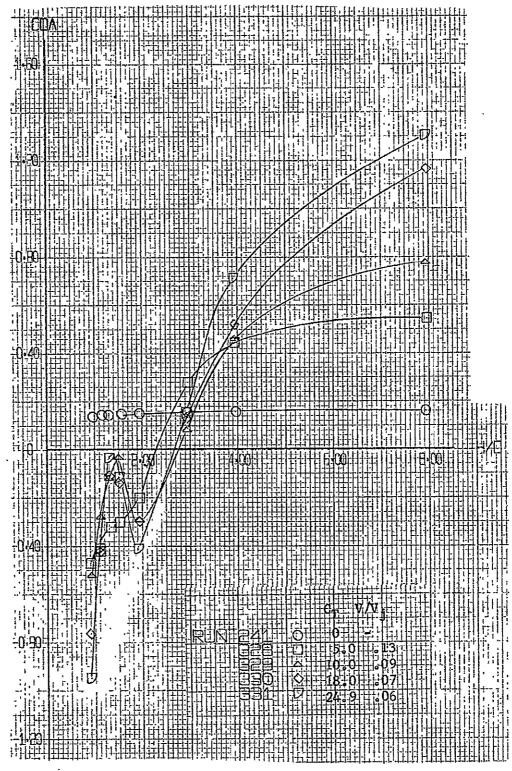


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=105^\circ;$   $\alpha=0^\circ;$  Ø =  $10^\circ$ 

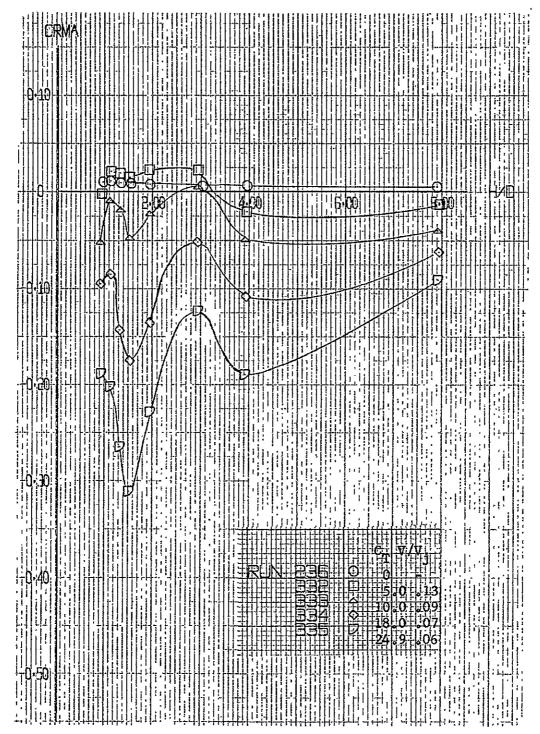


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)



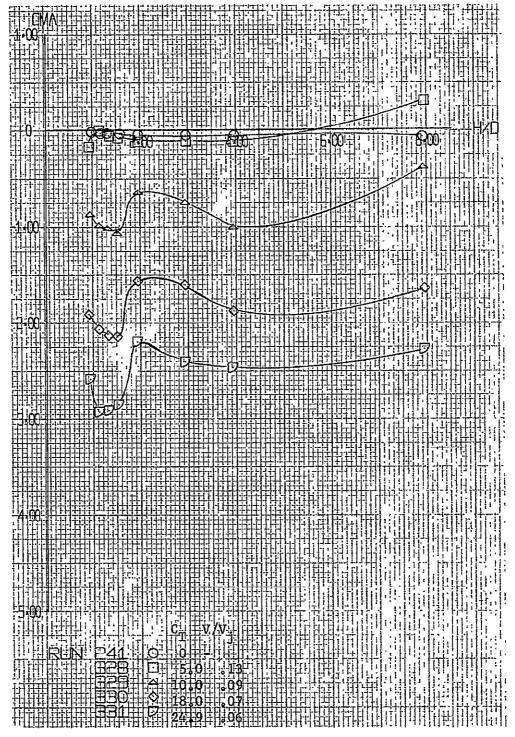


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Continued)

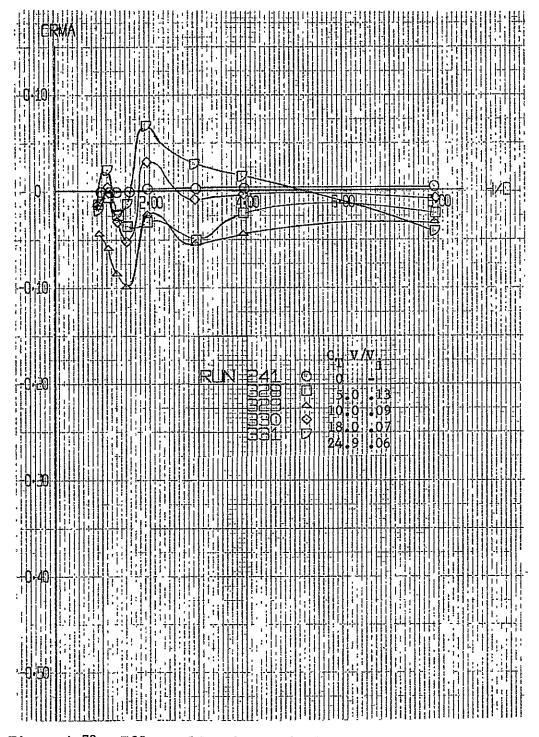


Figure A-70. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 10^\circ$  (Concluded)

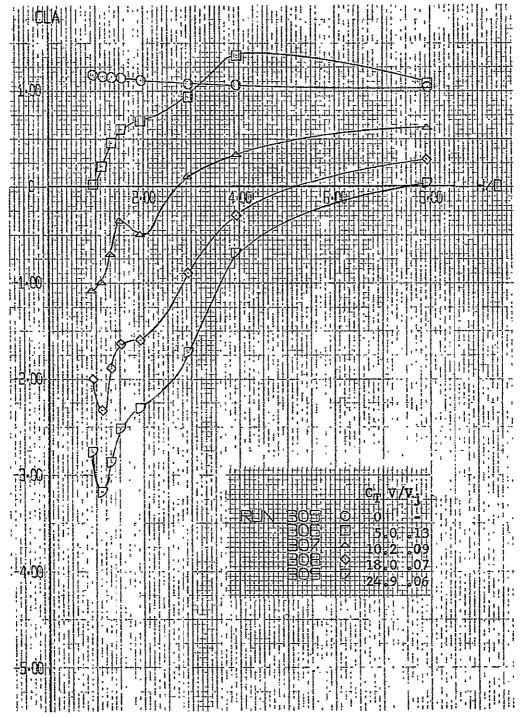


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_{\rm R}/T_{\rm L}=.8$ , Ground Board Configuration 1;  $\delta_{\rm N}=105^{\rm o};$   $\alpha=0^{\rm o};$  Ø = 0°

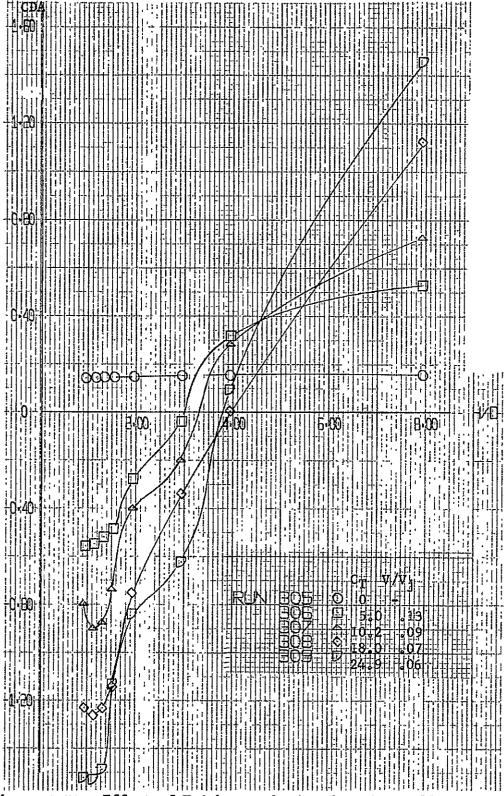


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

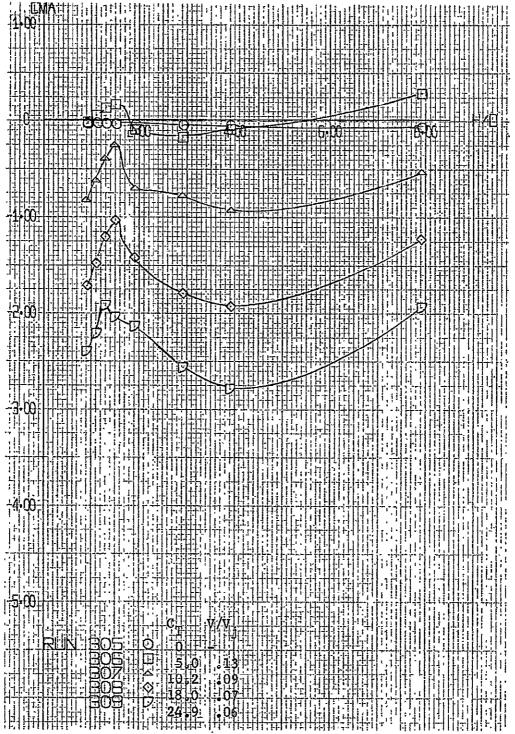


Figure A=71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 1;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

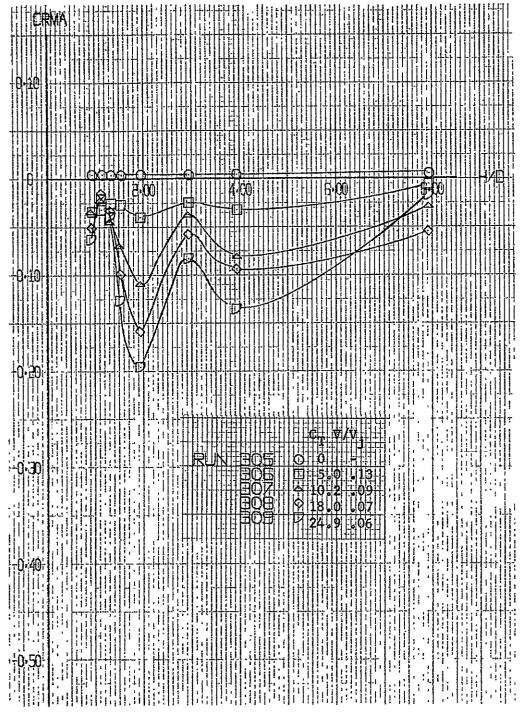


Figure A-71. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 1;  $\delta_N=105^\circ;$   $\alpha=0^\circ;$  Ø = 0° (Concluded)

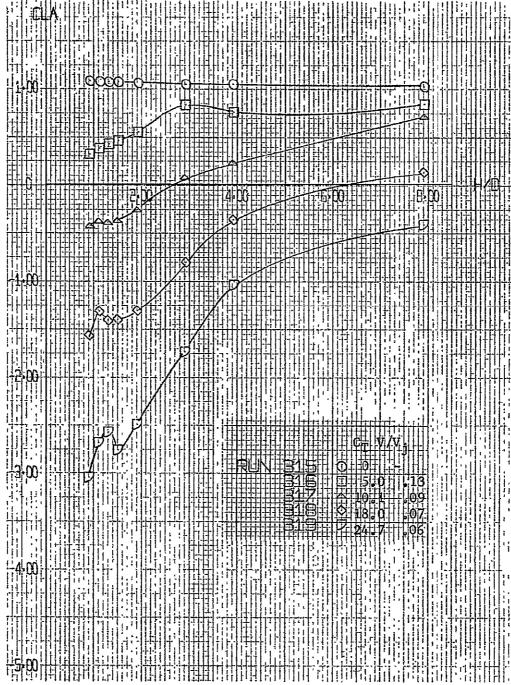


Figure A=72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$ 

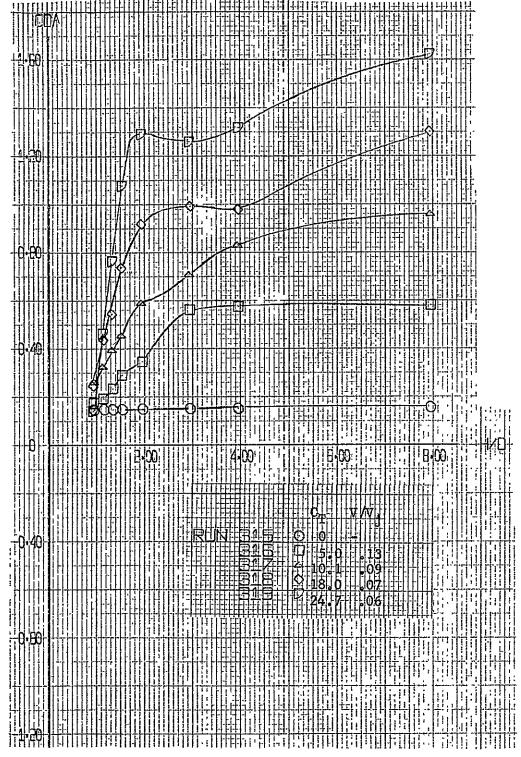
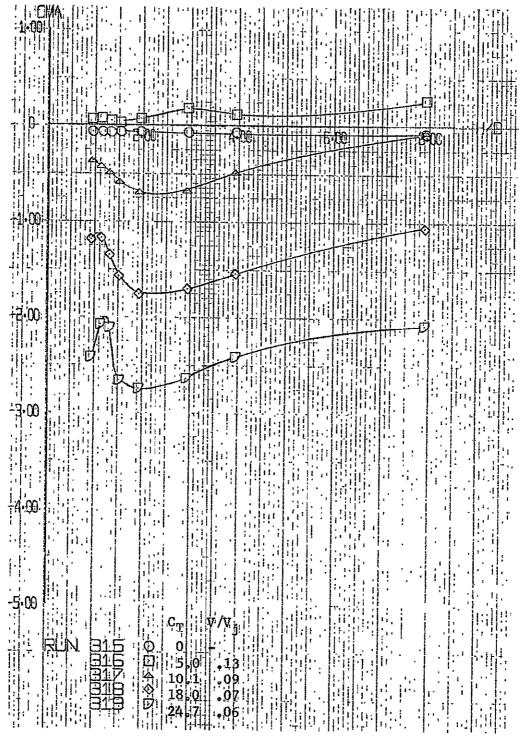


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Continued)



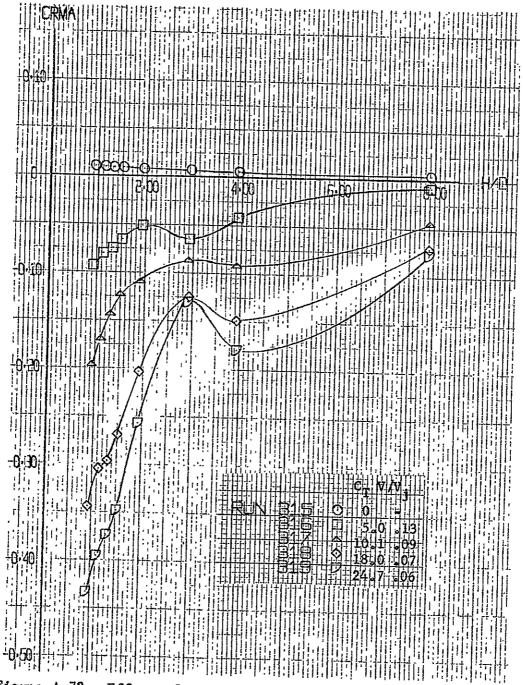


Figure A-72. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$  (Concluded)

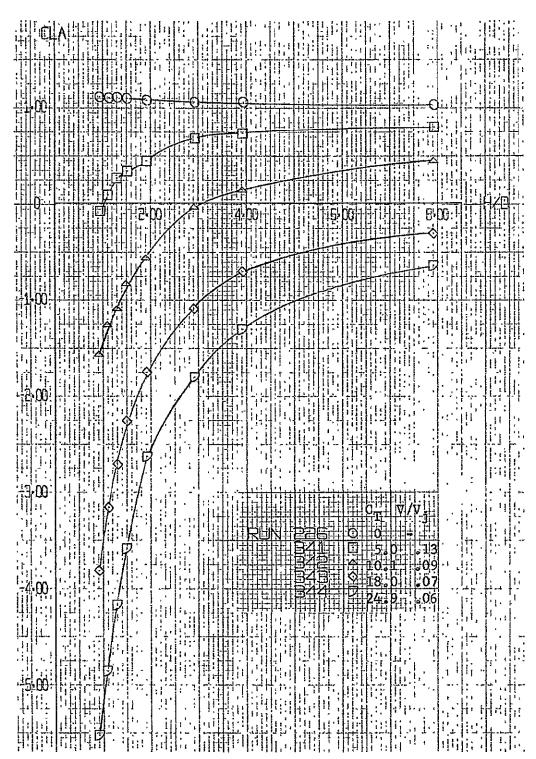


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\emptyset=-10^{\rm o}$ 

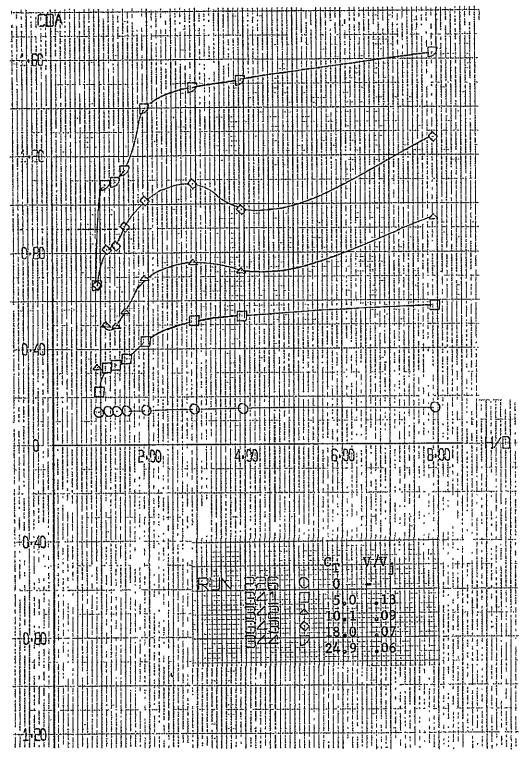


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = -10^\circ$  (Continued)

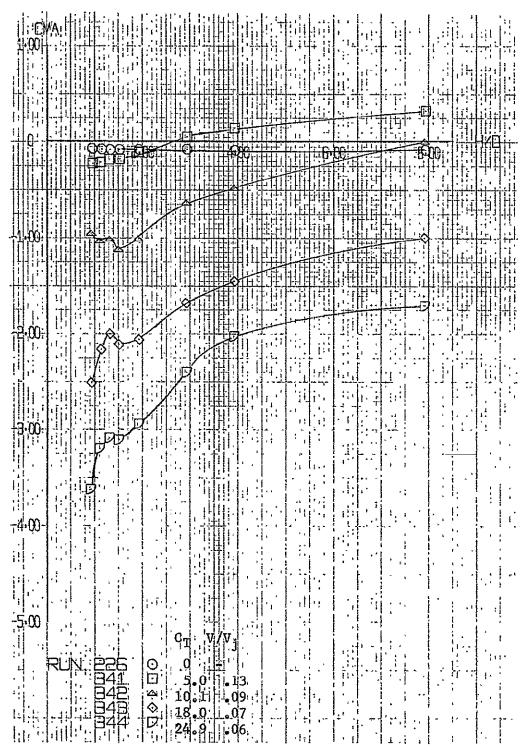


Figure A=73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=-10^\circ$  (Continued)

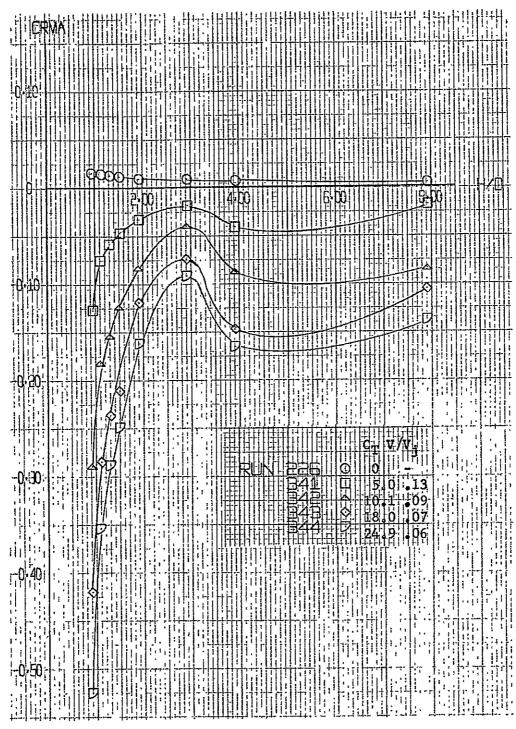


Figure A-73. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control In,  $T_R/T_{Lo}=.8, \text{ Ground Board Configuration 5; } \delta_N=105^o;$   $\alpha=0^o; \ \emptyset=-10^o \text{ (Concluded)}$ 

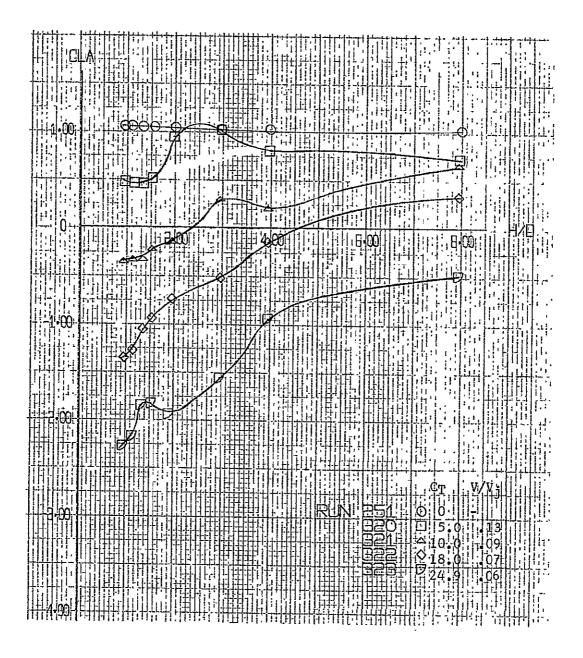


Figure A=74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=+10^\circ$ 

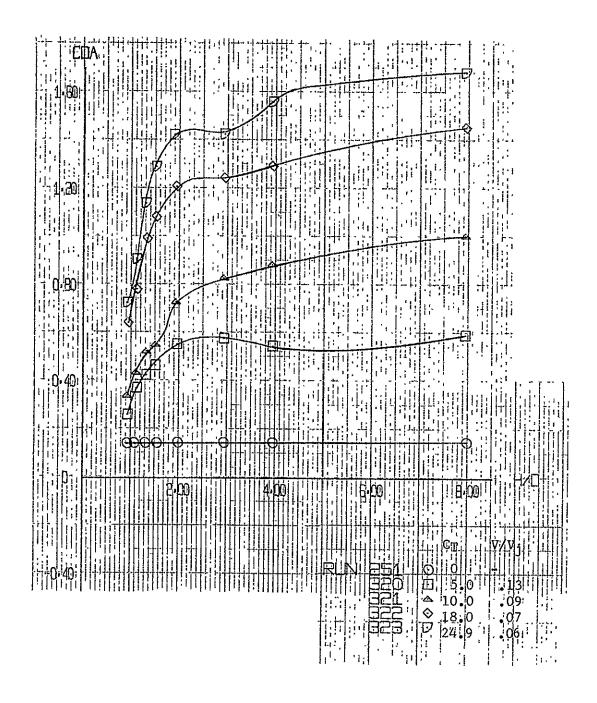


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=+10^\circ$  (Continued)

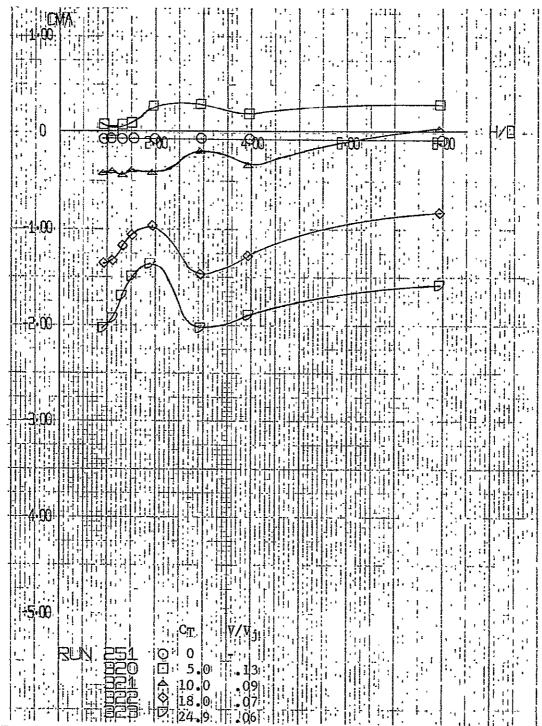


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L = .8$ , Ground Board Configuration 5;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = +10^\circ$  (Continued)

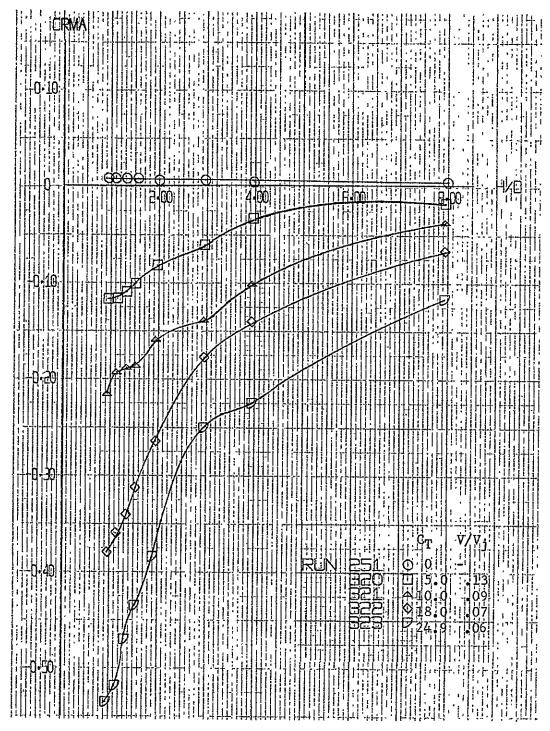


Figure A-74. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 5;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=+10^\circ$  (Concluded)

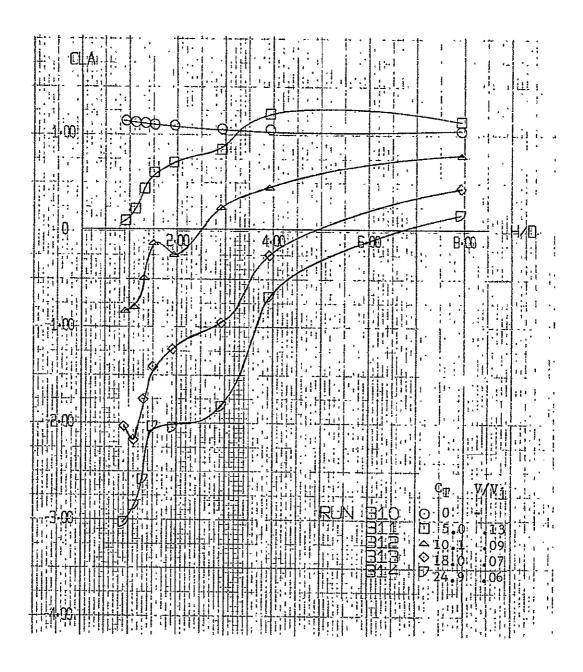


Figure A=75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=0^\circ$ 

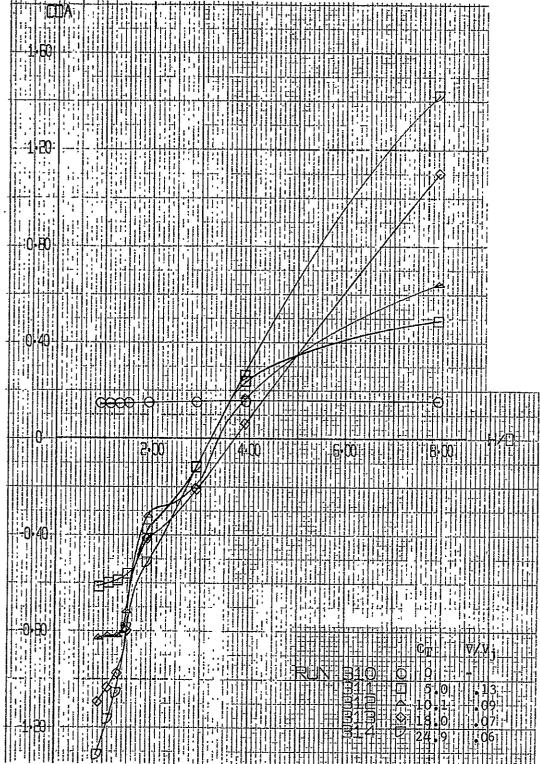


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = 0^\circ$  (Continued)

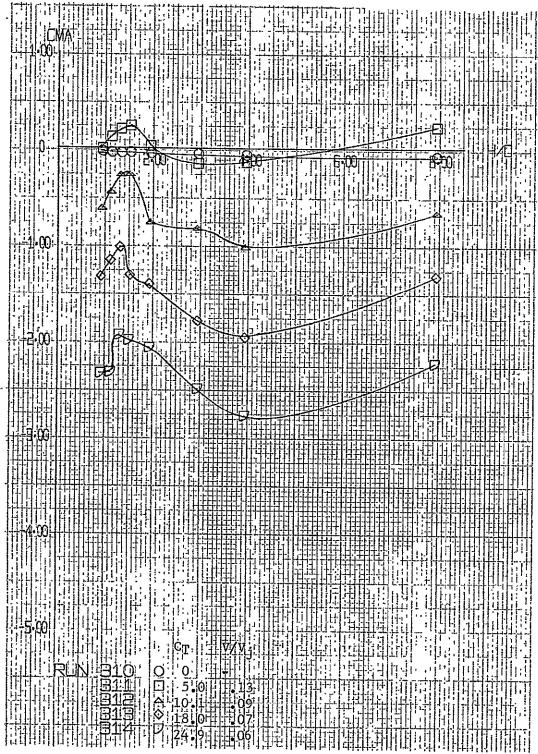


Figure A-75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\beta=0^\circ$  (Continued)

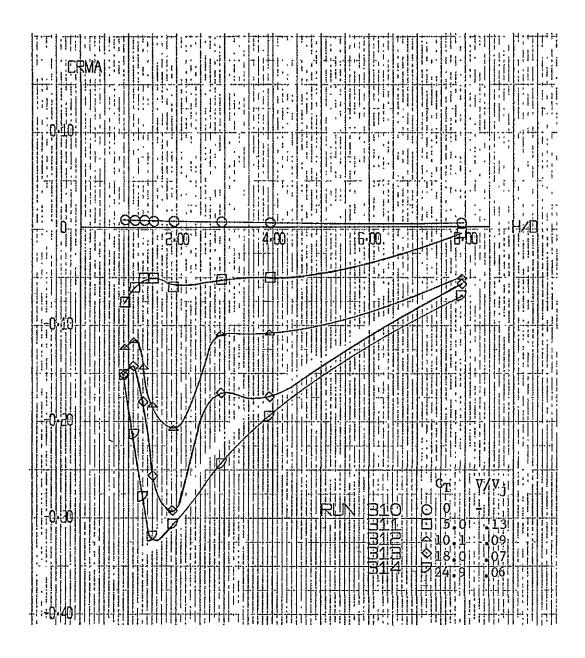


Figure A=75. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in, TR/TL=.8, Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0$ ;  $\emptyset=0^\circ$  (Concluded)

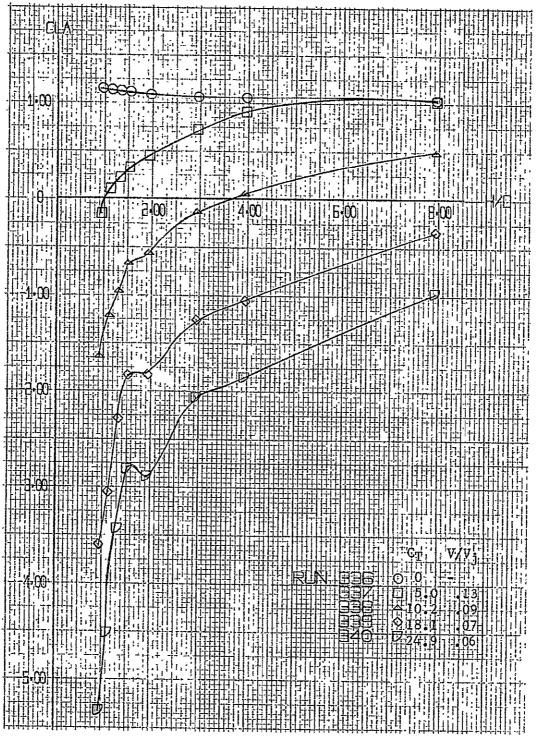


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$ 

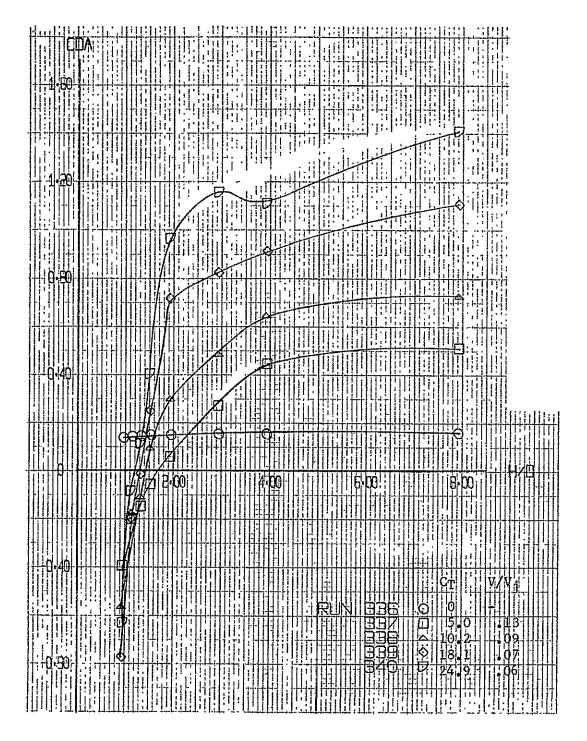


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Continued)

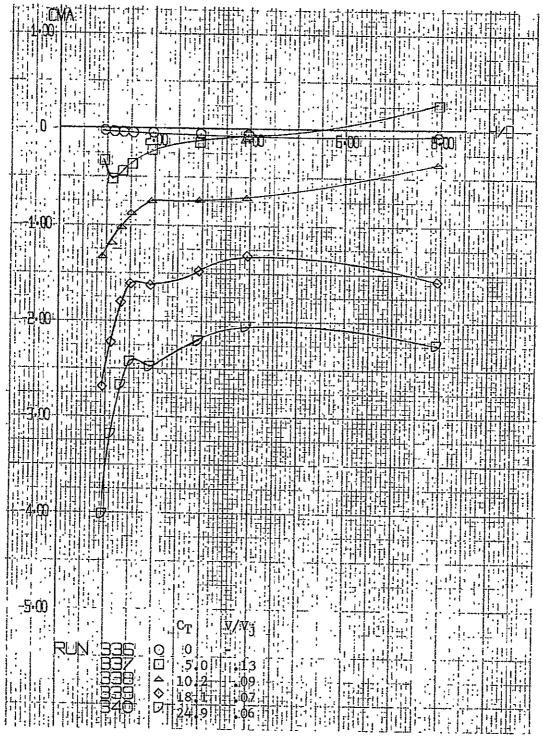


Figure A=76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Continued)

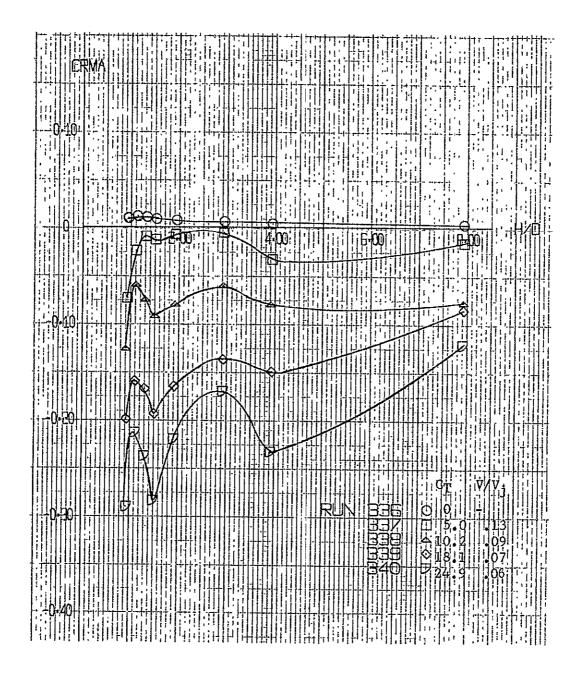


Figure A-76. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=-10^\circ$  (Concluded)

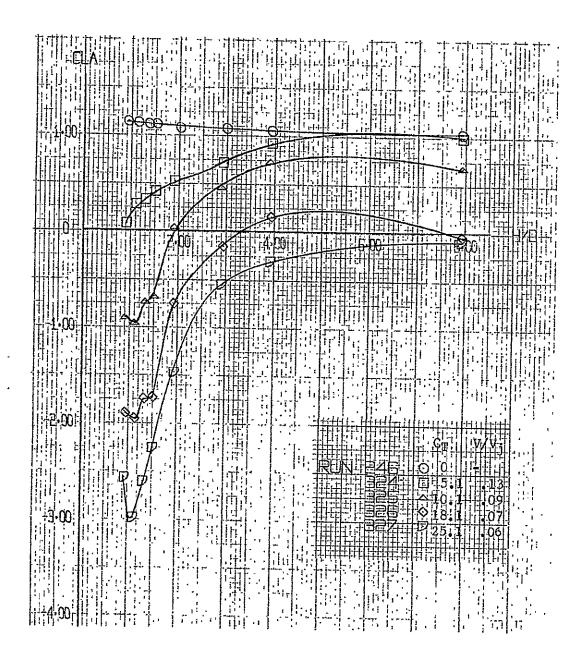


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^{\rm o}$ ;  $\alpha=0^{\rm o}$ ;  $\beta=+10^{\rm o}$ 

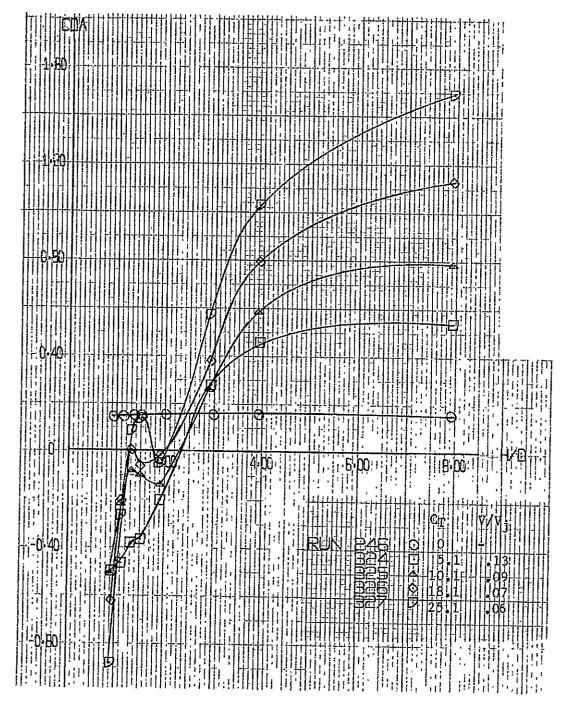


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ; .  $\emptyset=+10^\circ$  (Continued)



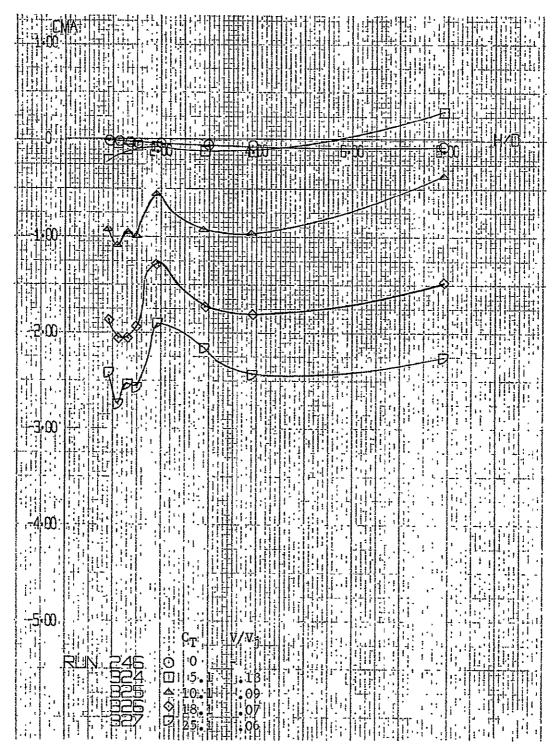


Figure A-77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L=.8$ , Ground Board Configuration 4;  $\delta_N=105^\circ$ ;  $\alpha=0^\circ$ ;  $\emptyset=+10^\circ$  (Continued)

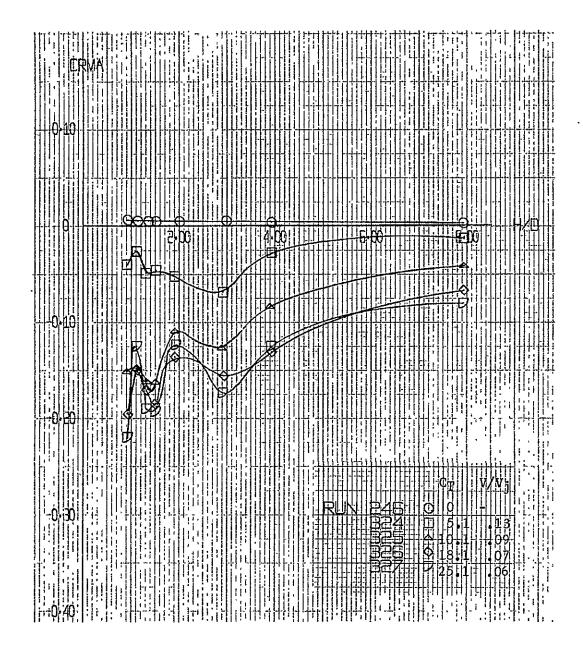


Figure A.77. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Lateral Control in,  $T_R/T_L = .8$ , Ground Board Configuration 4;  $\delta_N = 105^\circ$ ;  $\alpha = 0^\circ$ ;  $\emptyset = +10^\circ$  (Concluded)

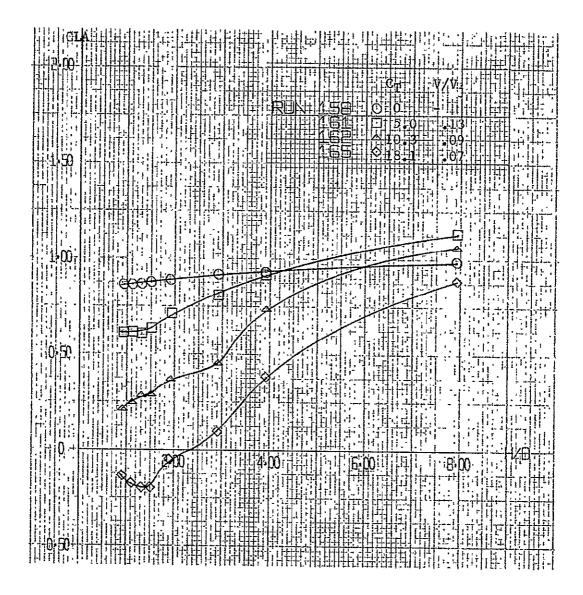


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NNose}$  = 80°,  $\delta_{\rm NAft}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 0°

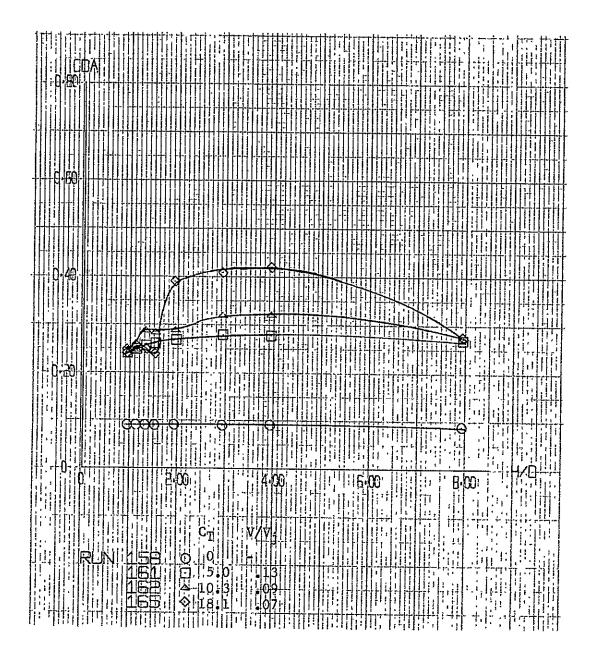


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm NNose} = 80^{\rm o} \;,\; \delta_{\rm NAft} = 90^{\rm o} \;;\; \alpha = 0^{\rm o} \;;\; \emptyset = 0^{\rm o} \;\; ({\rm Continued})$ 

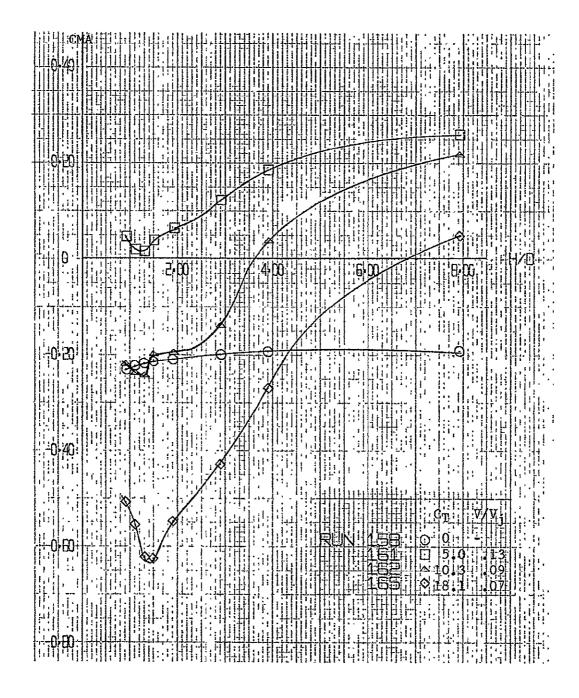


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{N_{Nose}} = 80^{\circ} \text{, } \delta_{N_{Aft}} = 90^{\circ} \text{; } \alpha = 0^{\circ} \text{1 } \emptyset = 0^{\circ} \text{ (Continued)}$ 

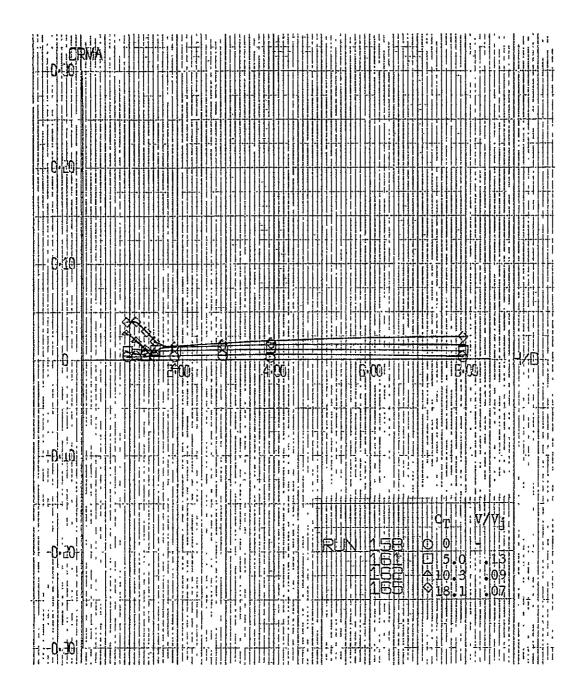
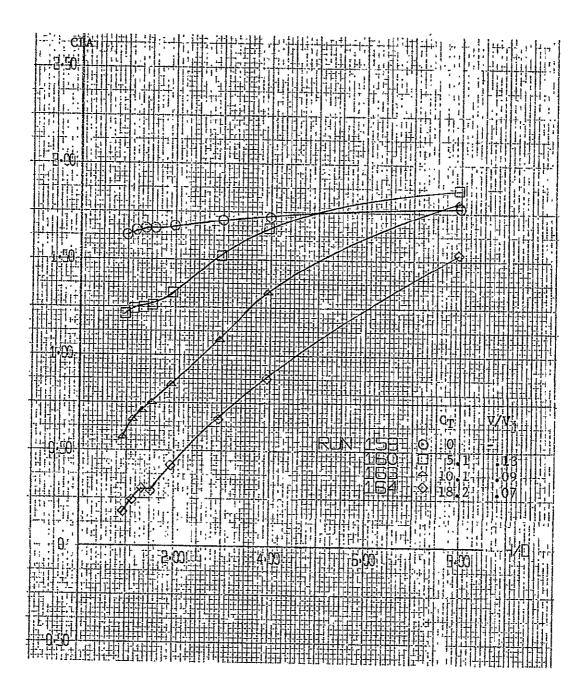


Figure A-78. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 2;  $\delta_{\rm N_{NOSe}} = 80^{\circ}, \; \delta_{\rm N_{Aft}} = 90^{\circ}; \; \alpha = 0^{\circ}; \; \emptyset = 0^{\circ} \; ({\rm Concluded})$ 



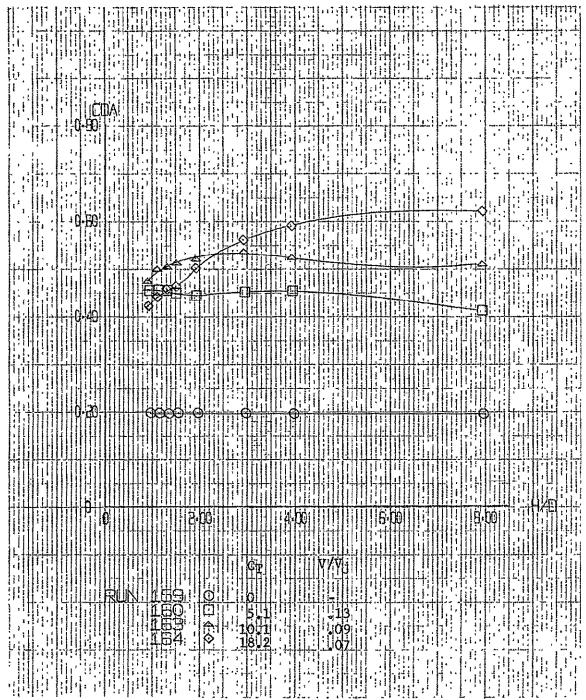


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration  $\delta_{\text{NNose}} = .80^{\circ}$ ,  $\delta_{\text{NAft}} = .90^{\circ}$ ,  $\alpha = .80^{\circ}$ ;  $\emptyset = .00^{\circ}$  (Continued)

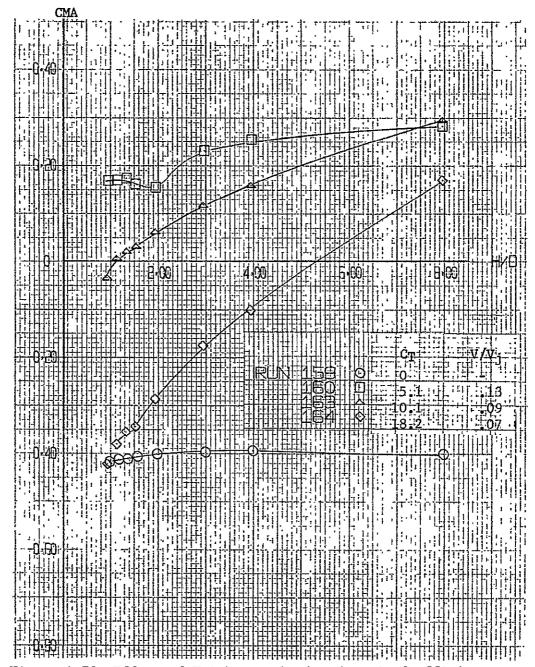
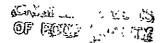


Figure A=79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration  $\delta N_{Nose} = 80^{\circ}$ ,  $\delta N_{Aft} = 90^{\circ}$ ,  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)



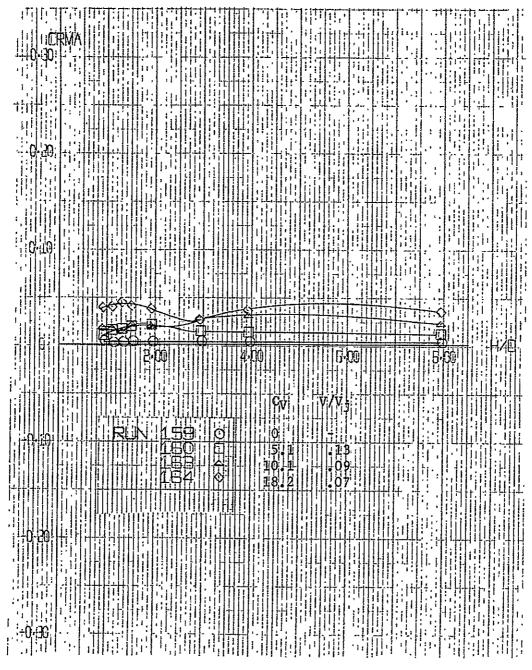


Figure A-79. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration  $\delta_{\rm NNose}=80^{\circ}$ ,  $\delta_{\rm NAft}=90^{\circ}$ ,  $\alpha=8^{\circ}$ ;  $\emptyset=0^{\circ}$  (Concluded)

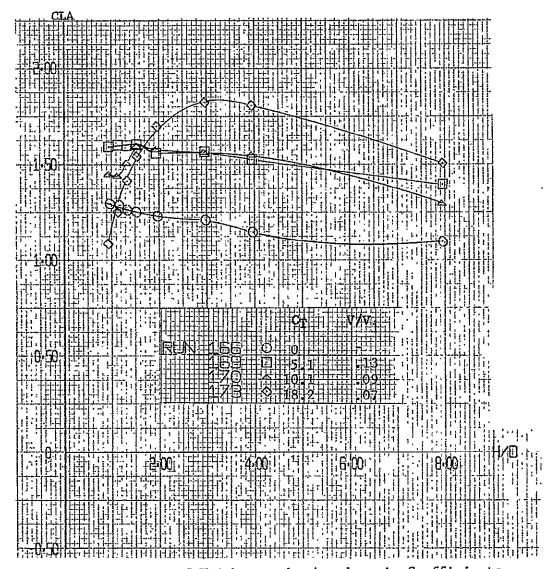


Figure A=80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\mathrm{N}_{\mathrm{Nose}}}$  = 80°,  $\delta_{\mathrm{N}_{\mathrm{Aft}}}$  = 90°;  $\alpha$  = 0°;  $\emptyset$  = 0°

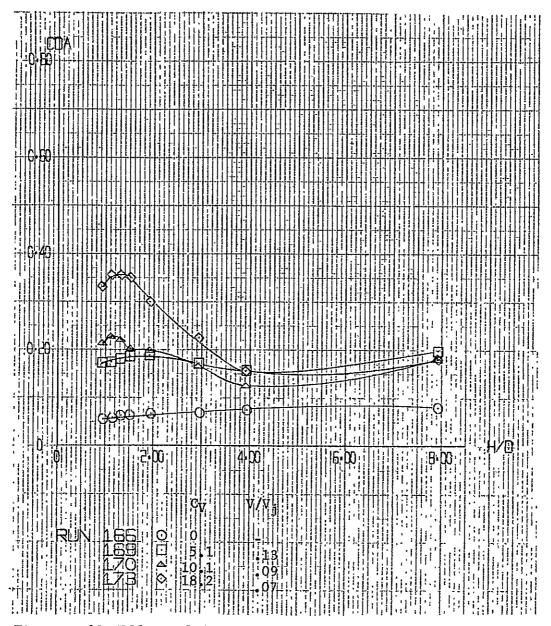


Figure A-80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta N_{Nose} = 80^{\circ}$ ,  $\delta N_{Aft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

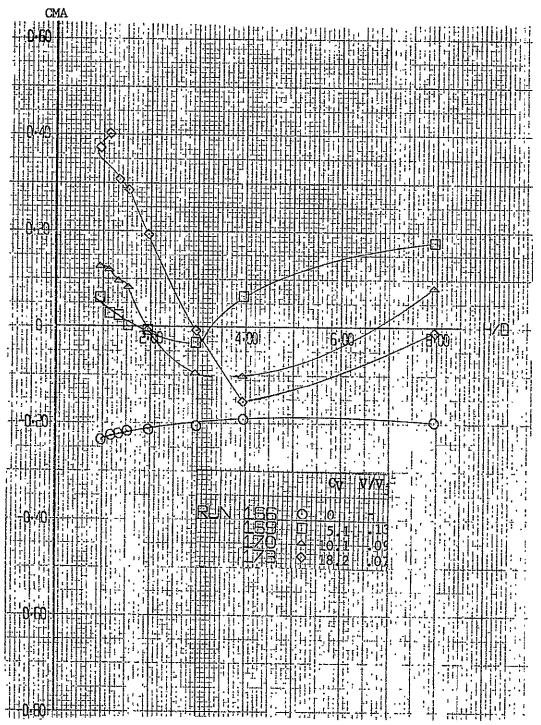


Figure A=80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\rm NNose} = 80^{\circ}$ ,  $\delta_{\rm NAft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

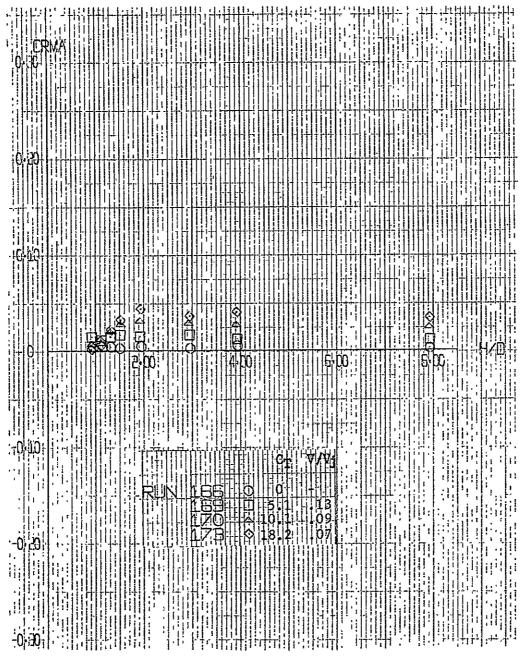


Figure A=80. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\rm NNose}$  = 80°,  $\delta_{\rm NAft}$  = 90°,  $\alpha$  = 0°;  $\emptyset$  = 0° (Concluded)



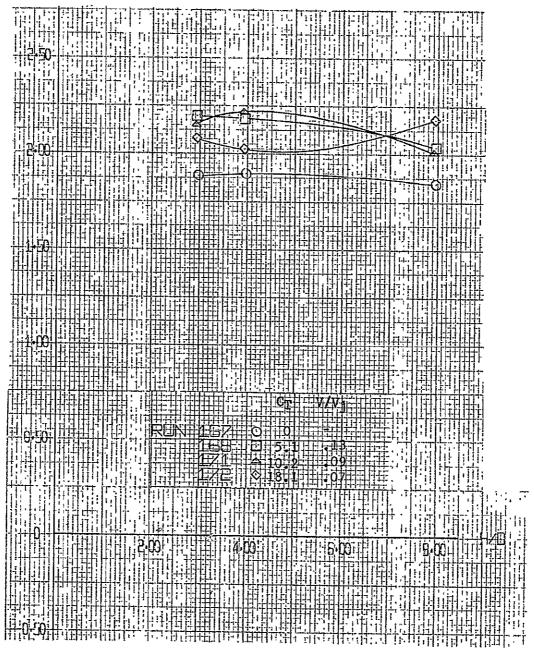


Figure A=81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\rm N_{NOSe}} = 80^\circ_{\rm a}$ ,  $\delta_{\rm N_{A}ft} = 90^\circ$ ,  $\alpha = 8^\circ$ ;  $\emptyset = 0^\circ$ 

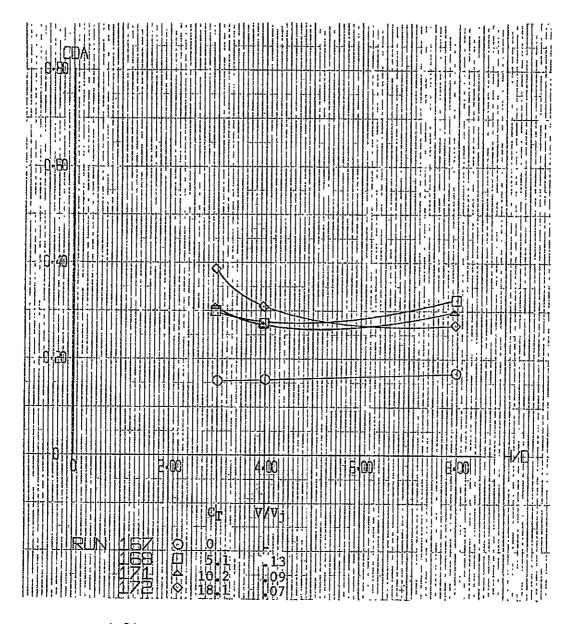


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\mathrm{N}_{N}} = 80^{\circ}$ ,  $\delta_{\mathrm{N}_{A}} = 90^{\circ}$ ,  $\alpha = 8^{\circ}$ ;  $\beta = 0^{\circ}$  (Continued)

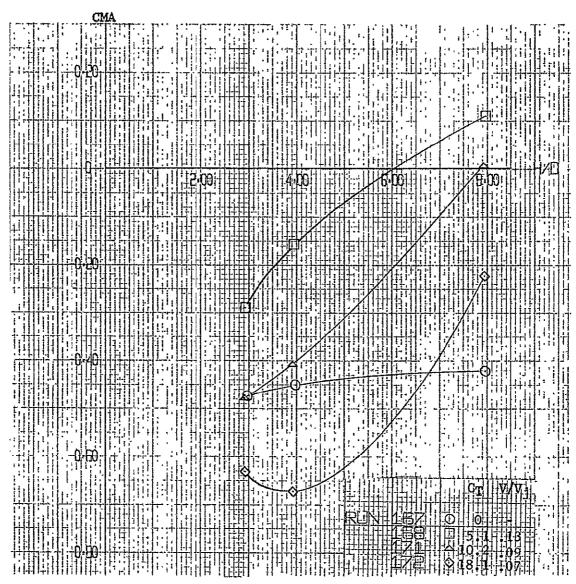


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3;  $\delta_{\rm N_{NOSe}}$  = 80°,  $\delta_{\rm N_{Aft}}$  = 90°,  $\alpha$  = 8°;  $\emptyset$  = 0° (Continued)

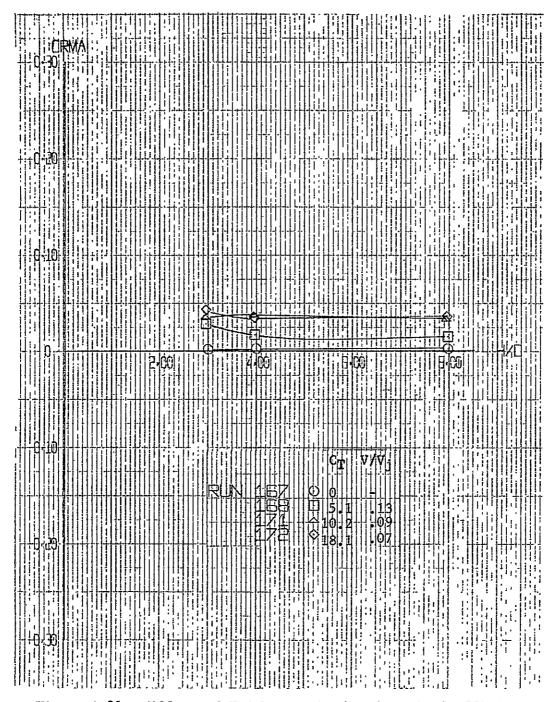


Figure A-81. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 3,  $\delta_{\mathrm{Nose}} = 80^{\circ}$ ,  $\delta_{\mathrm{NAft}} = 90^{\circ}$ ,  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Concluded)

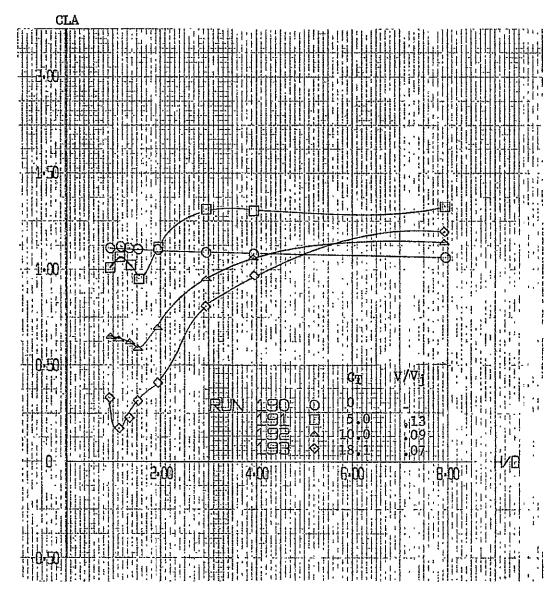


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1;  $\delta_{\rm N_{OSe}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = -10^{\circ}$ 

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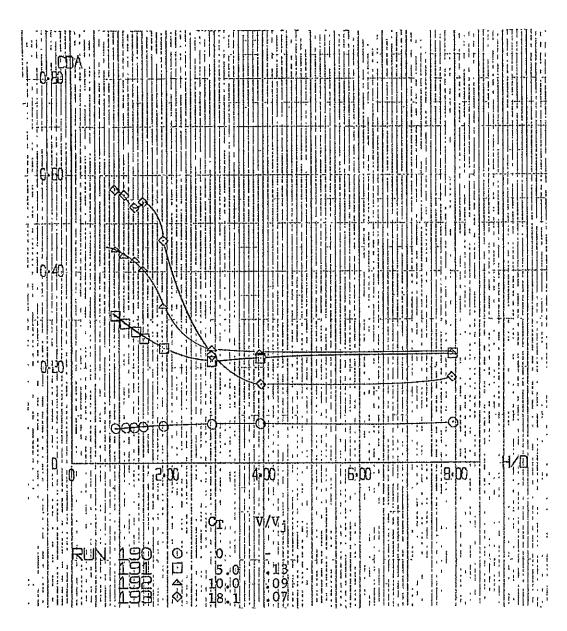


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1;  $\delta N_{Nose} = 80^{\circ}$ ,  $\delta N_{Aft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = -10^{\circ}$  (Continued)



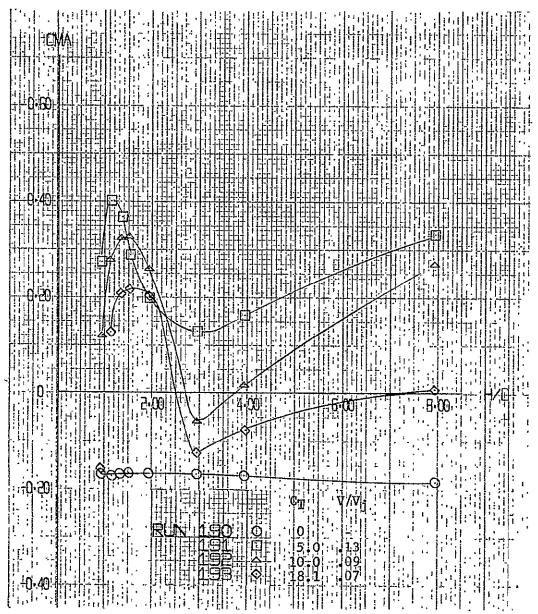


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels. Ground Board Configuration 1;  $\delta_{\text{N}_{\text{Nose}}} = 80^{\circ}$ ,  $\delta_{\text{NAft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = -10^{\circ}$  (Continued)

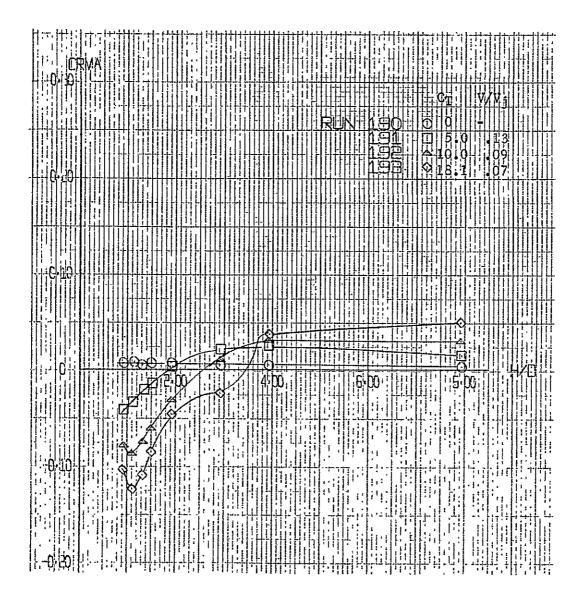


Figure A-82. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta N_{\hbox{Nose}} \,=\, 80^{\circ} \,, \,\, \delta N_{\hbox{Aft}} \,=\, 90^{\circ} \,, \,\, \alpha \,=\, 0^{\circ} \,; \,\, \emptyset \,=\, -10^{\circ} \,\, (\hbox{Concluded})$ 

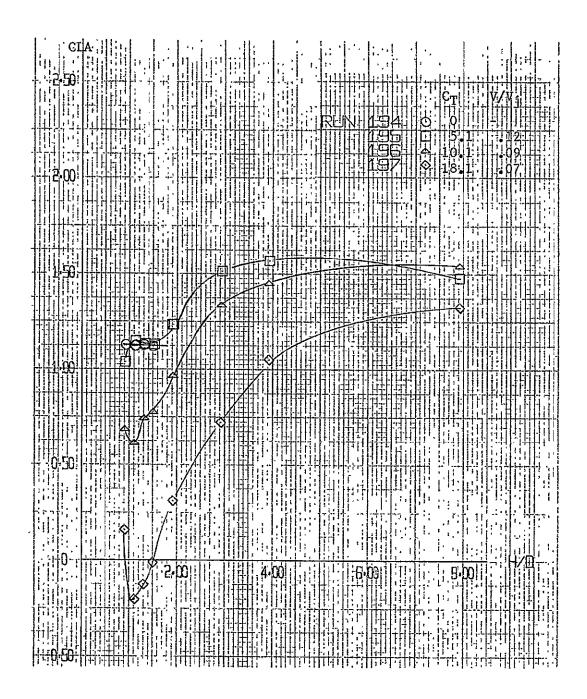


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{NOSe}} = 80^\circ, \ \delta_{\rm N_{Aft}} = 90^\circ, \ \alpha = 0^\circ; \ \emptyset = +10^\circ$ 

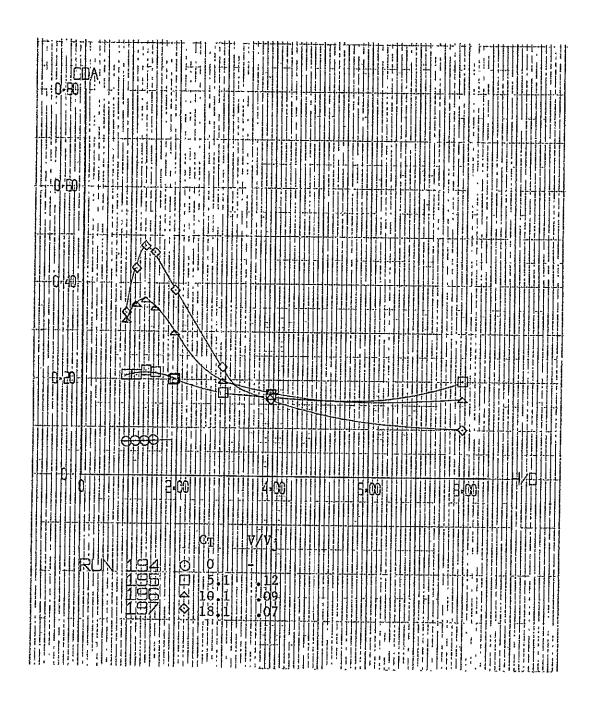


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NNose} = 80^{\circ}, \ \delta_{\rm NAft} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = +10^{\circ} \ ({\rm Continued})$ 

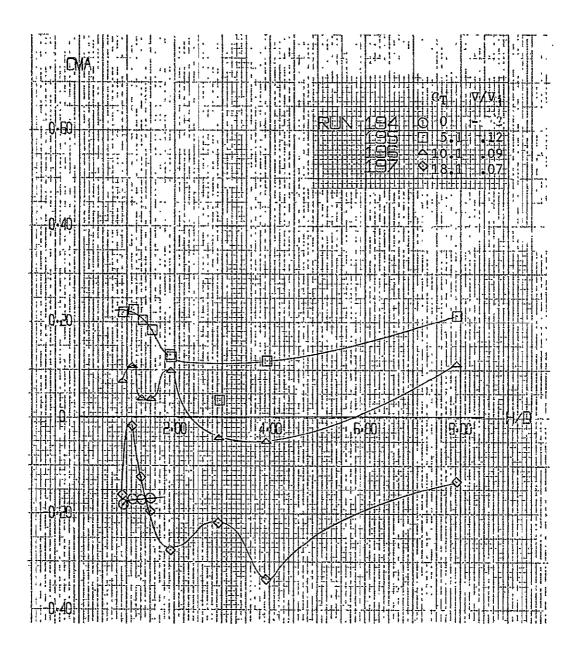


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{NOSe}} = 80^{\circ}, \quad \delta_{\rm N_{Aft}} = 90^{\circ}, \quad \alpha = 0^{\circ}; \quad \emptyset = +10^{\circ} \; ({\rm Continued})$ 

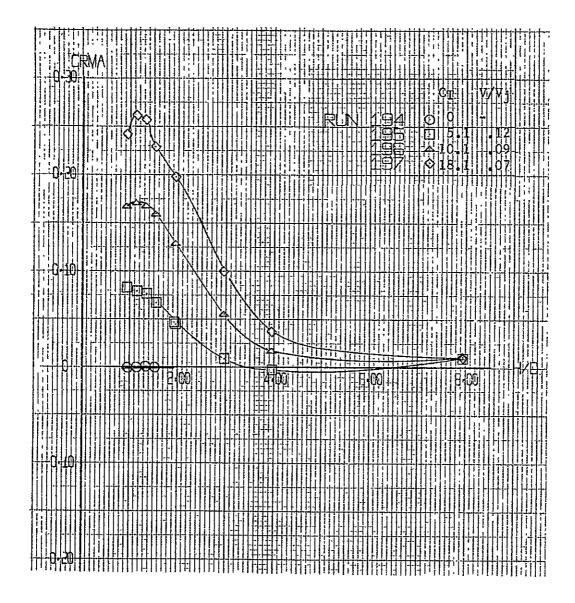


Figure A-83. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta N_{\text{Nose}} = 80^{\circ}, \ \delta N_{\text{Aft}} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = +10^{\circ} \ (\text{Concluded})$ 

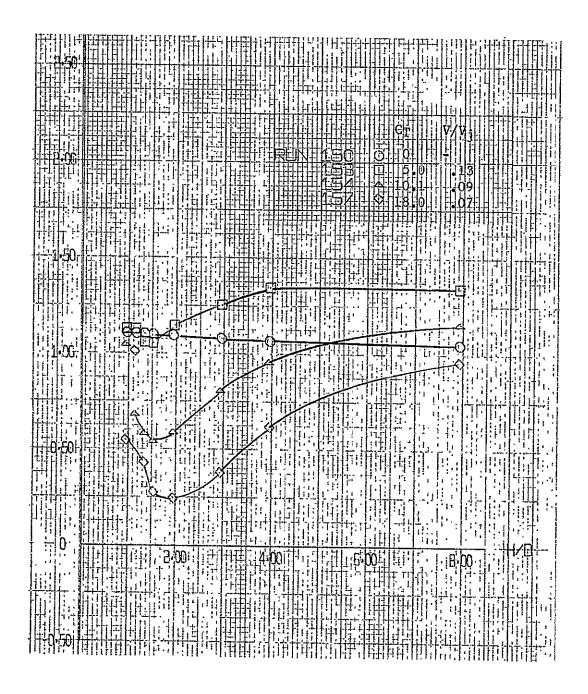


Figure A=84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta N_{Nose} = 80^{\circ}$ ,  $\delta N_{Aft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$ 

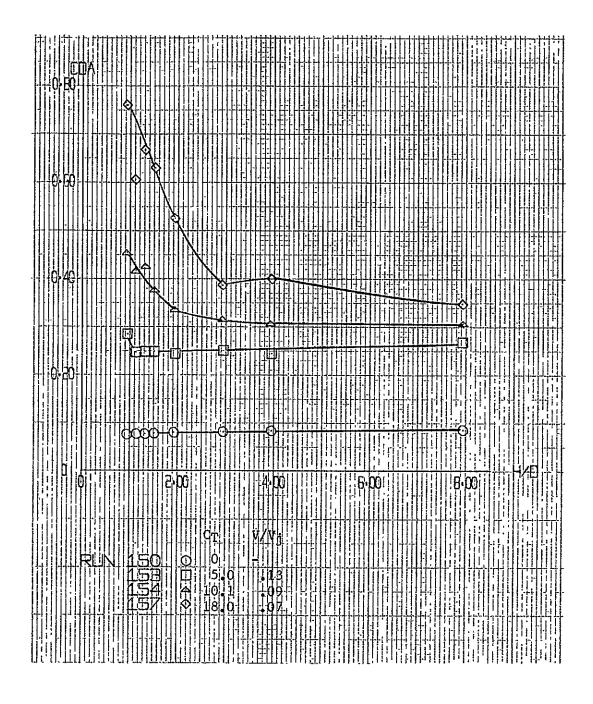


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{OSe}} = 80^{\circ}, \; \delta_{\rm NAft} = 90^{\circ}, \; \alpha = 0^{\circ}; \; \emptyset = 0^{\circ} \; ({\rm Continued})$ 

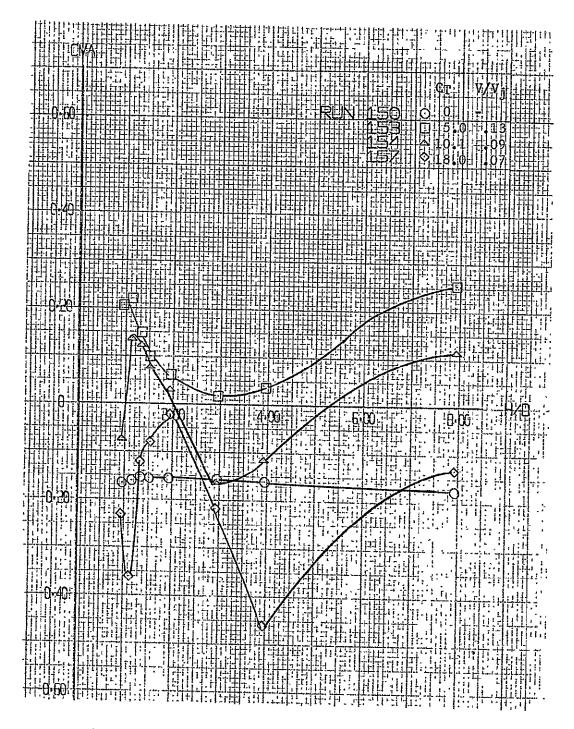


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta N_{Nose} = 80\%$ ,  $\delta N_{Aft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\beta = 0^{\circ}$  (Continued)

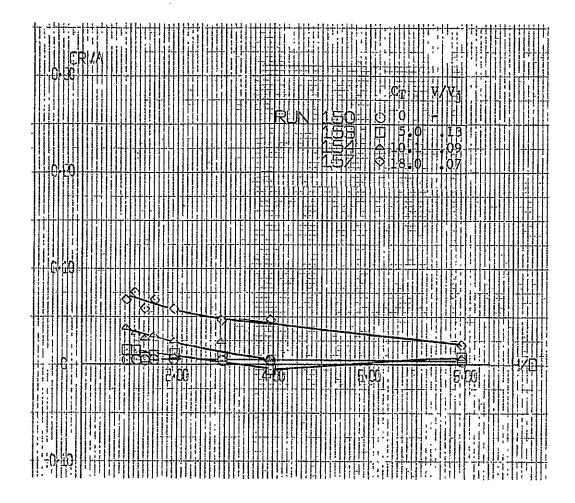


Figure A-84. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NNose} = 80^{\circ}$ ,  $\delta_{\rm NAft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Concluded)

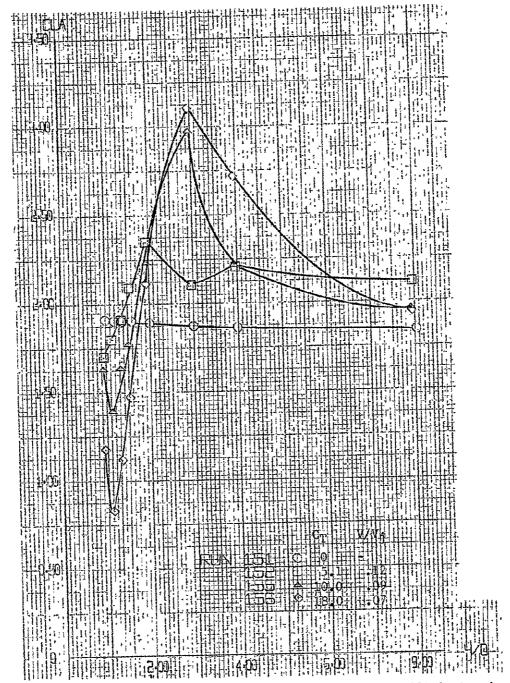


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{NOSe}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$ 

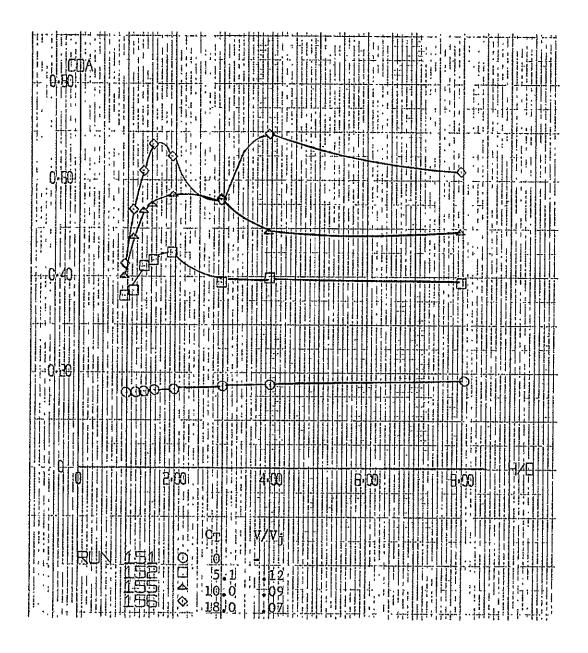


Figure A=85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\text{Nose}} = 80^{\circ}, \ \delta_{\text{NAft}} = 90^{\circ}, \ \alpha = 8^{\circ}; \ \emptyset = 0^{\circ} \ \text{(Continued)}$ 

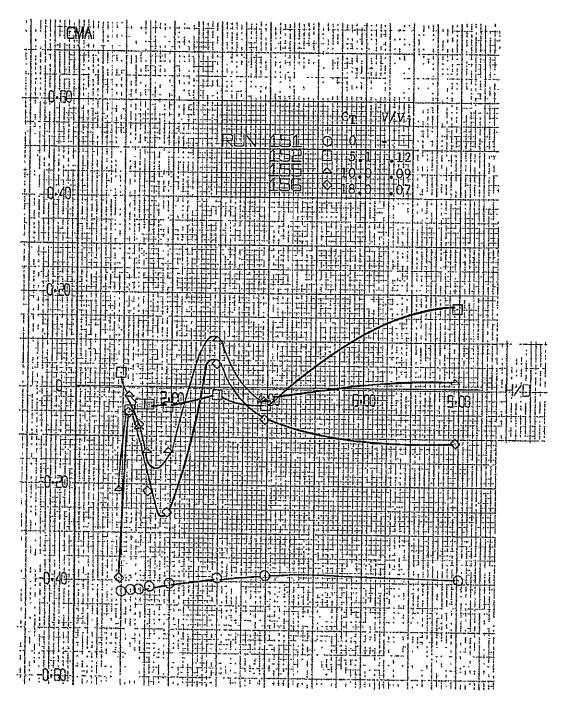


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm N_{NOSe}} = 80^{\circ}, \; \delta_{\rm NAft} = 90^{\circ}, \; \alpha = 8^{\circ}; \; \emptyset = 0^{\circ} \; ({\rm Continued})$ 

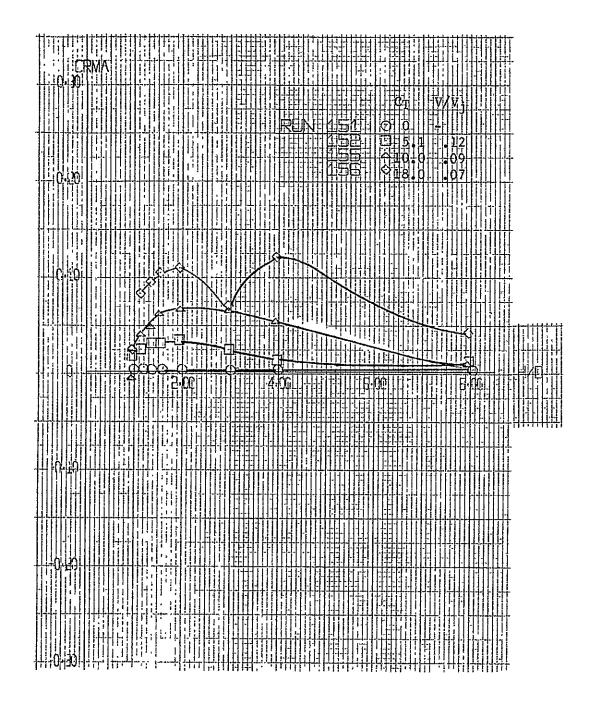


Figure A-85. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 1;  $\delta_{\rm NNose} = 80^{\circ}$ ,  $\delta_{\rm NAft} = 90^{\circ}$ ,  $\alpha = 8^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Concluded)

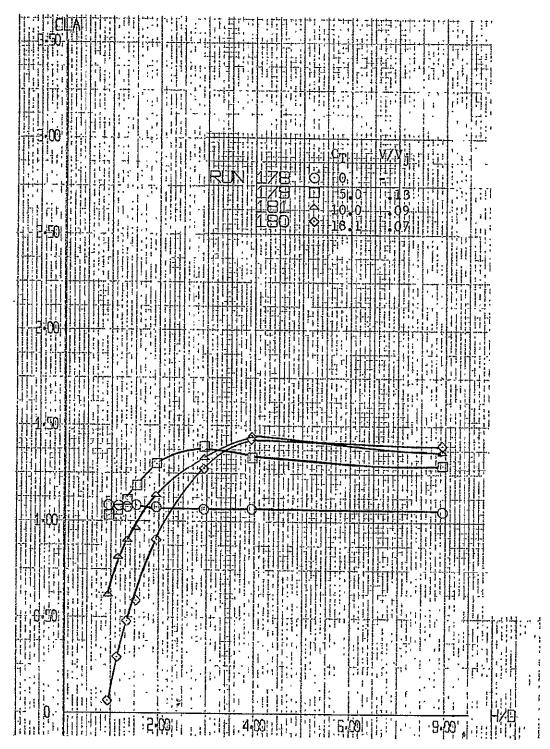


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NNose} = 80^{\circ}, \ \delta_{\rm NAft} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = 0^{\circ}$ 

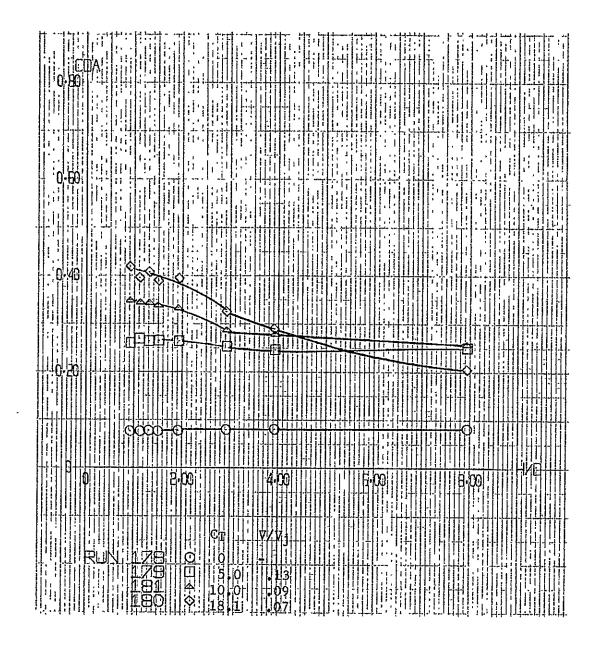


Figure A-86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{Nose}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

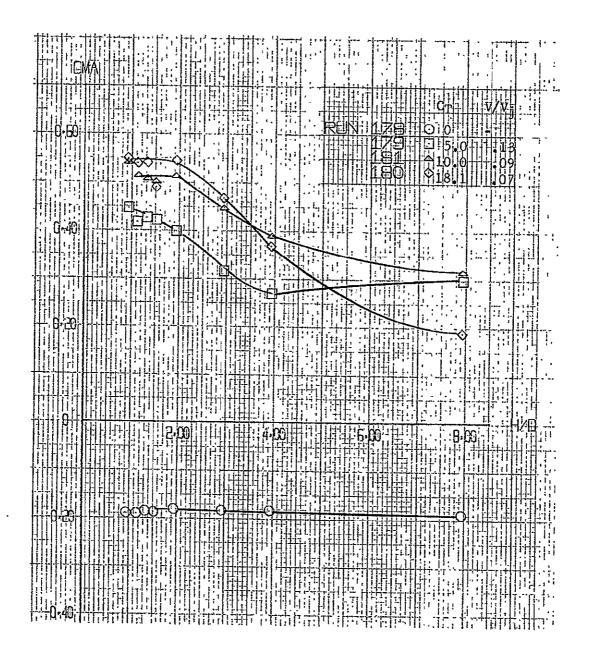


Figure A=86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NNose} = 80^{\circ}$ ,  $\delta_{\rm NAft} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Continued)

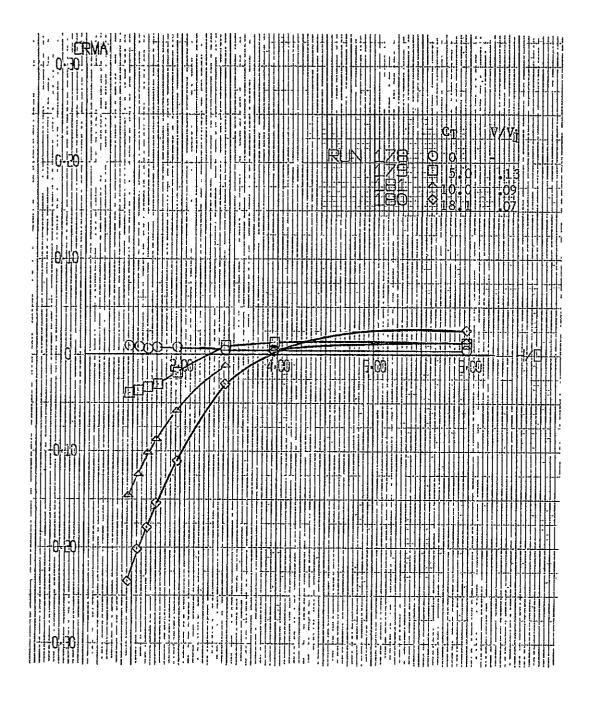


Figure A=86. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{NOSe}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha_{\rm n} = 0^{\circ}$ ;  $\emptyset = 0^{\circ}$  (Concluded)

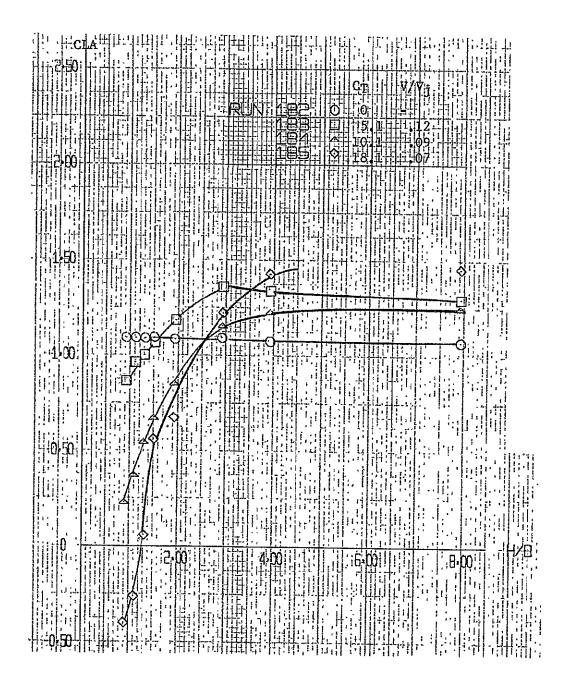


Figure A=87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{OSe}} = 80^{\circ}, \ \delta_{\rm N_{Aft}} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = -10^{\circ}$ 

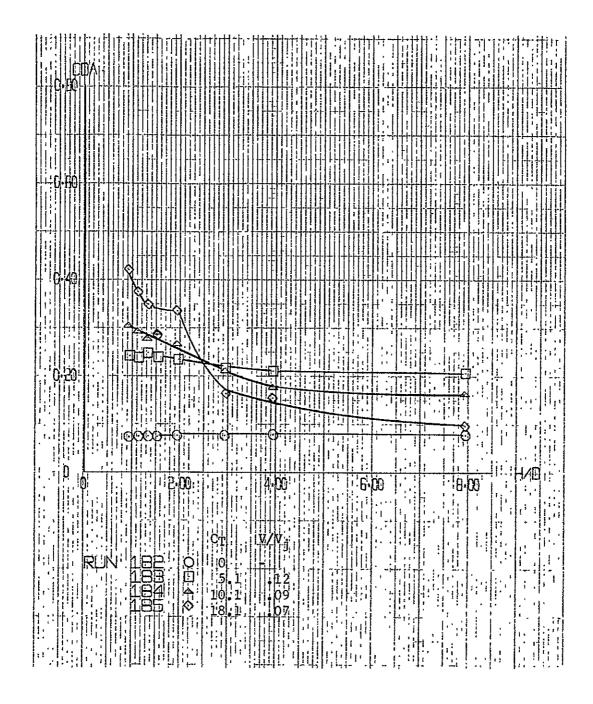


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{OSE}} = 80^{\circ}, \; \delta_{\rm N_{Aft}} = 90^{\circ}, \; \alpha = 0^{\circ}; \; \emptyset = -10^{\circ} \; ({\rm Continued})$ 

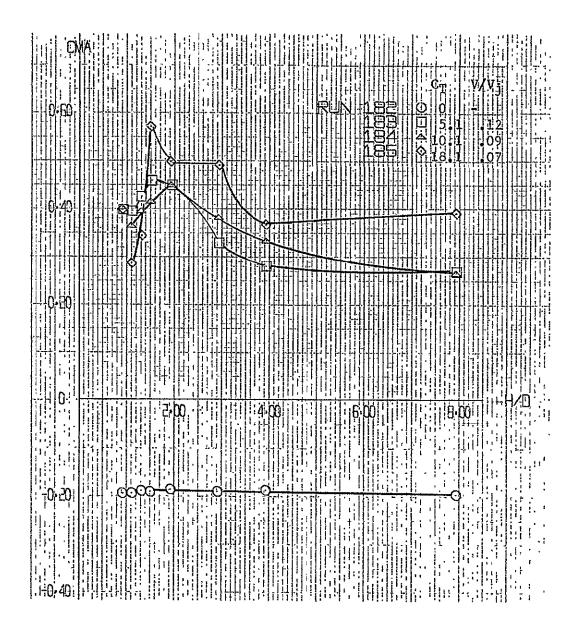


Figure A=87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{Nose}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = -10^{\circ}$  (Continued)

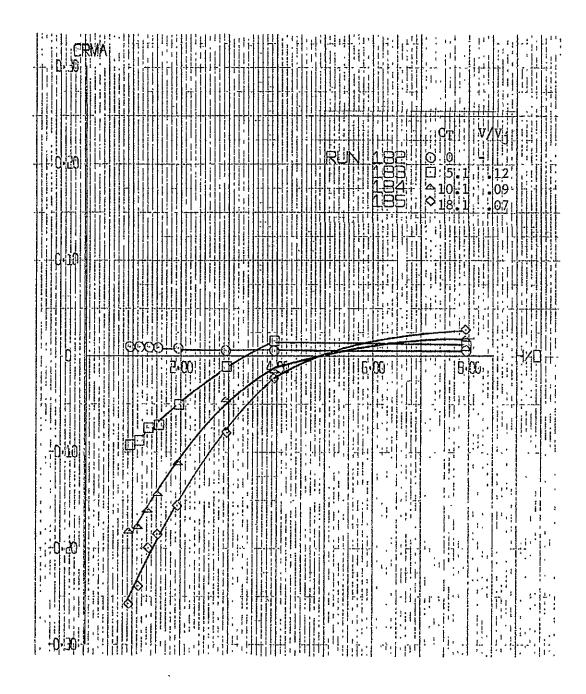


Figure A-87. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm NNose} = 80^{\circ}, \ \delta_{\rm NAft} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = -10^{\circ} \ ({\rm Concluded})$ 

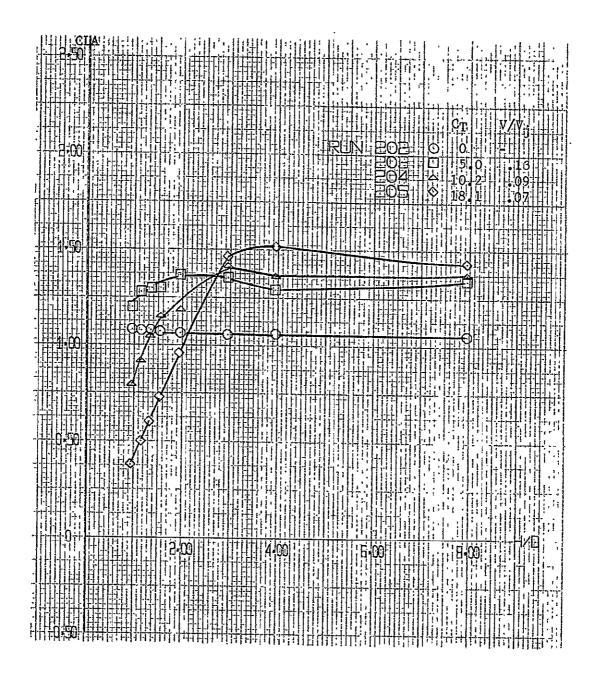


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{NOSe}}=80^{\circ},~\delta_{\rm N_{Aft}}=90^{\circ},~\alpha=0^{\circ};~\emptyset=+10^{\circ}$ 

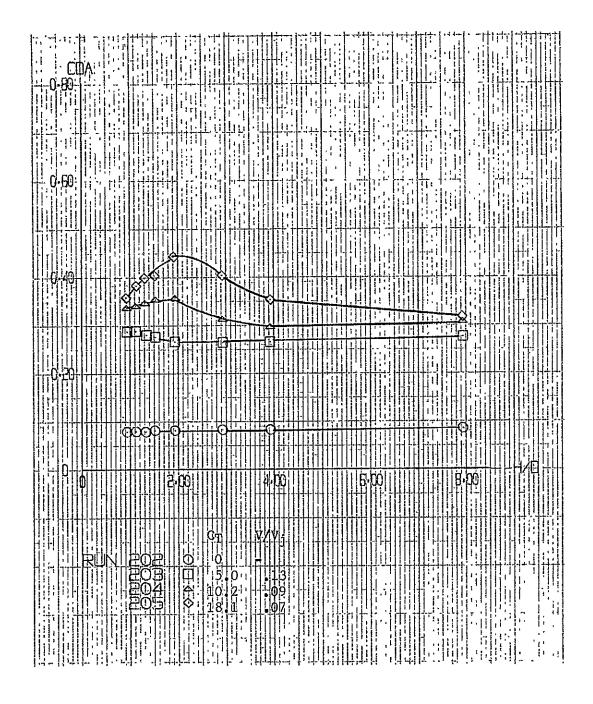


Figure A=88. `Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{NOSe}} = 80^{\circ}, \; \delta_{\rm N_{Aft}} = 90^{\circ}, \; \alpha = 0^{\circ}; \; \emptyset = +10^{\circ} \; ({\rm Continued})$ 

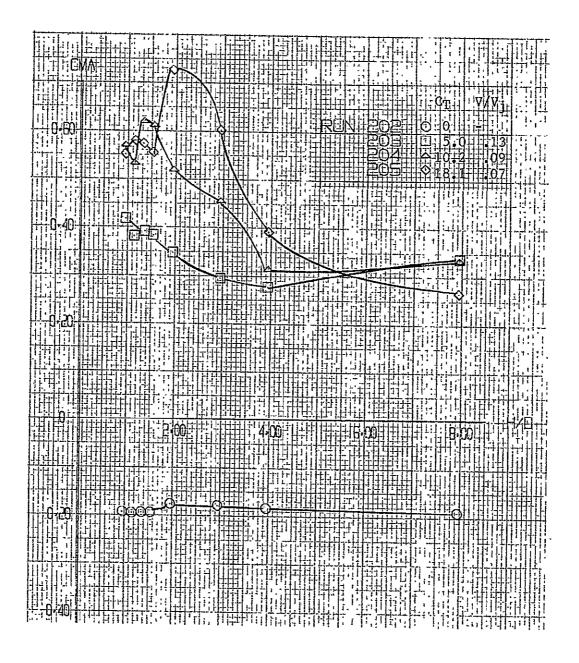


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\rm N_{Nose}} = 80^{\circ}$ ,  $\delta_{\rm N_{Aft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\emptyset = +10^{\circ}$  (Continued)

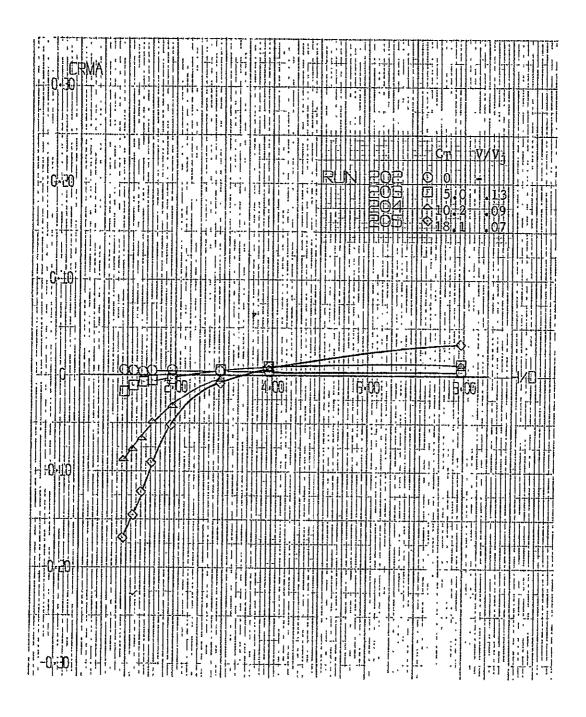


Figure A-88. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 5;  $\delta_{\text{NNose}} = 80^{\circ}\text{, } \delta_{\text{NAft}} = 90^{\circ}\text{, } \alpha = 0^{\circ}\text{; } \emptyset = +10^{\circ} \text{ (Concluded)}$ 

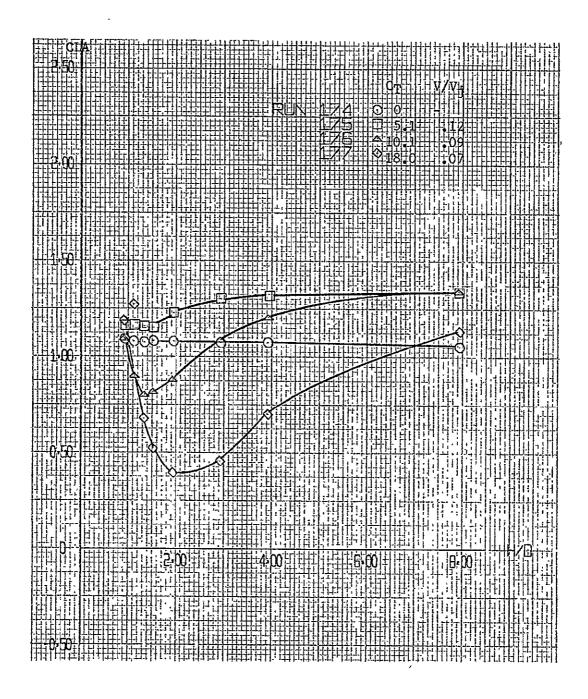


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{N} = 80^{\circ}, \ \delta_{N} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = 0^{\circ}$  Nose

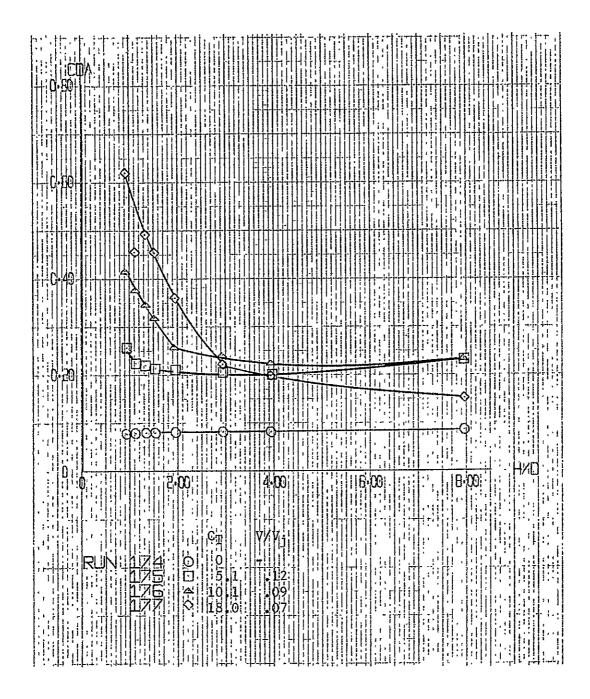
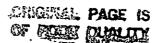


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{NOSe}} = 80^{\rm o}, \ \delta_{\rm N_{Aft}} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset = 0^{\rm o} \ ({\rm Continued})$ 



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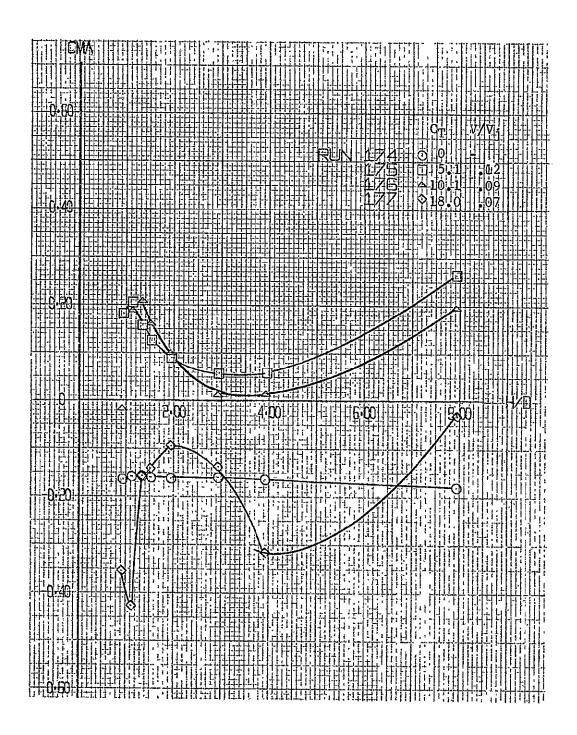


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NNose} = 80^{\rm o}$ ;  $\delta_{\rm NAft} = 90^{\rm o}$ ,  $\alpha = 0^{\rm o}$ ;  $\emptyset = 0^{\rm o}$  (Continued)

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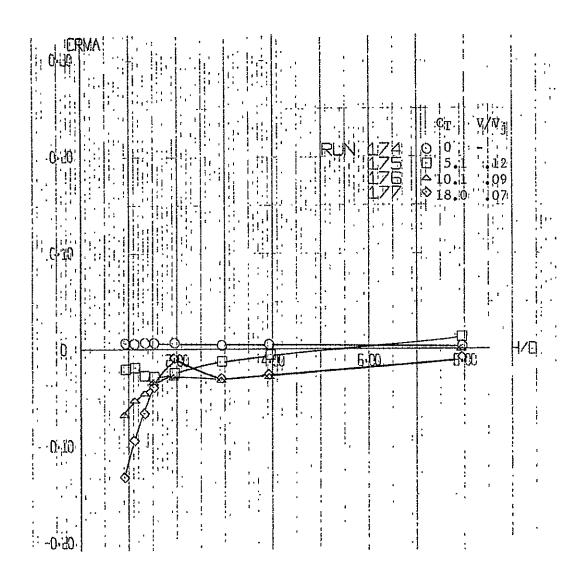


Figure A-89. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{NOSe}} = 80^{\rm o}, \ \delta_{\rm N_{Aft}} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset = 0^{\rm o}$  (Concluded)

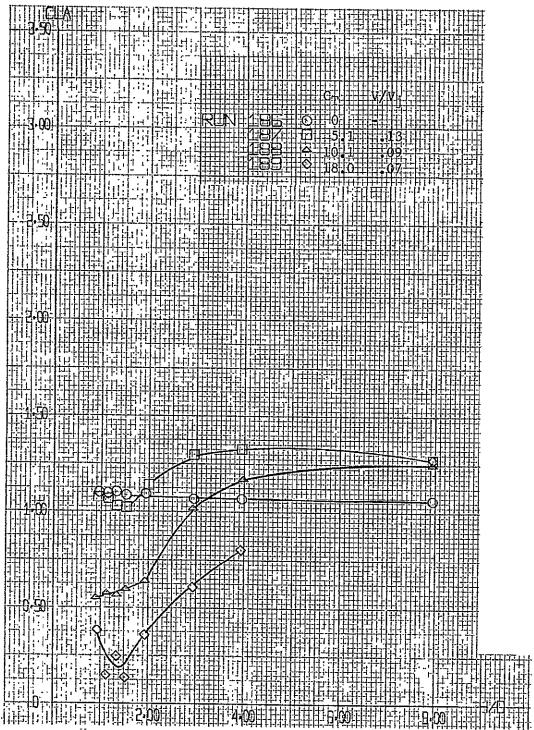


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\text{Nose}} = 80^{\circ}$ ,  $\delta_{\text{NAft}} = 90^{\circ}$ ,  $\alpha = 0^{\circ}$ ;  $\beta = -10^{\circ}$ 

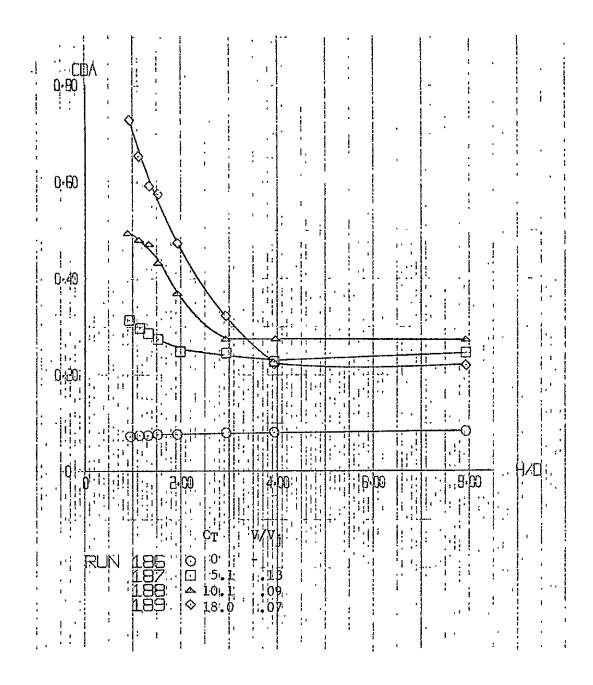


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{OSe}} = 80^{\rm o}, \; \delta_{\rm N_{Aft}} = 90^{\rm o}, \; \alpha = 0^{\rm o}; \; \emptyset = -10^{\rm o} \; ({\rm Continued})$ 

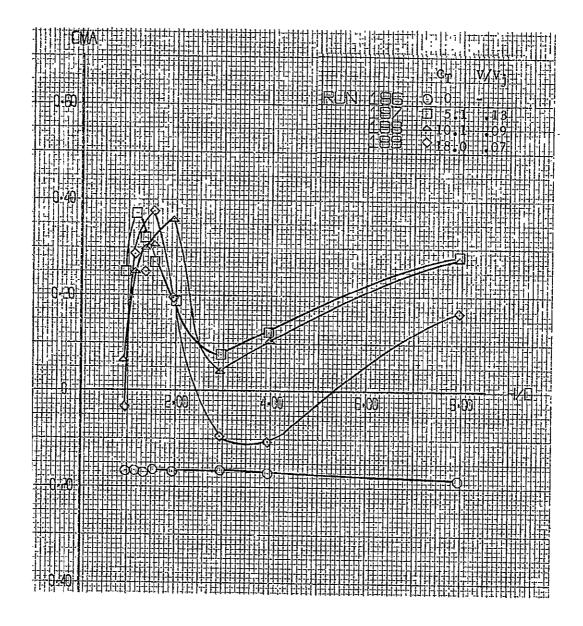


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NNose} = 80^{\rm o}, \ \delta_{\rm NAft} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset - 10^{\rm o} \ ({\rm Continued})$ 

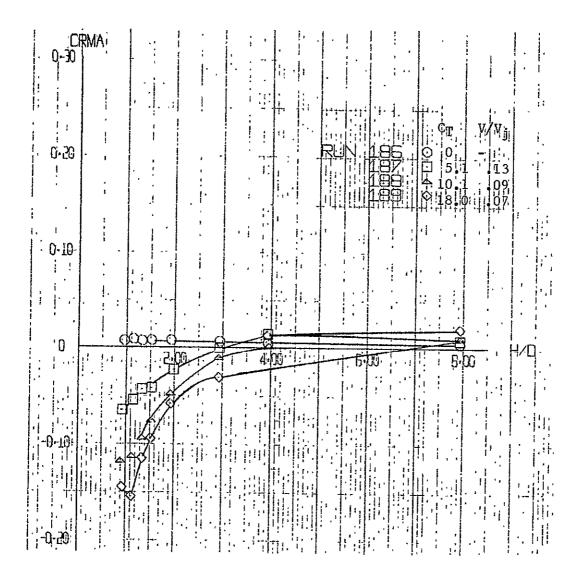


Figure A-90. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NNose} = 80^{\rm b}, \ \delta_{\rm NAft} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset =-10^{\rm o} \ ({\rm Concluded})$ 



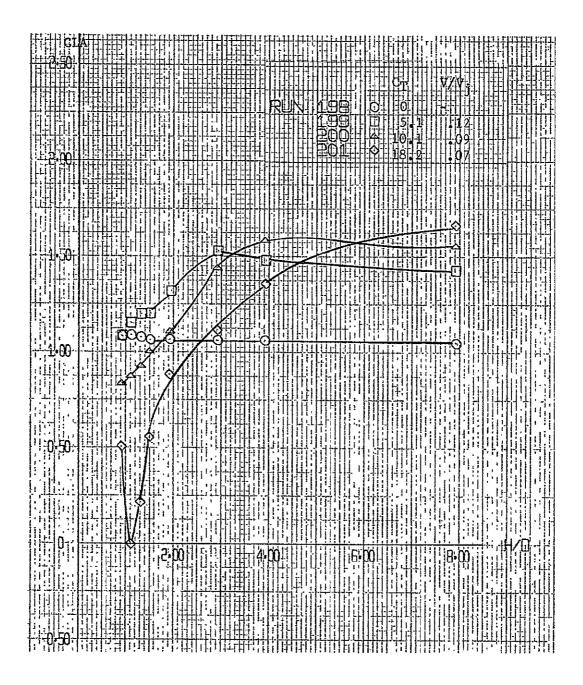


Figure A=91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{N_{NOSe}} = 80^{\circ}, \ \delta_{N_{Aff}} = 90^{\circ}, \ \alpha = 0^{\circ}; \ \emptyset = +10^{\circ}$ 

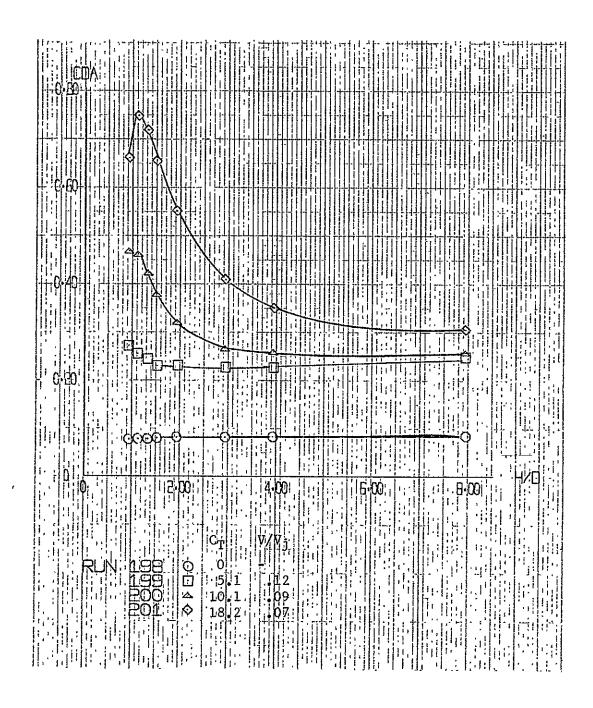


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm NNose} = 80^{\rm o}, \ \delta_{\rm NAft} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset = +10^{\rm o} \ ({\rm Continued})$ 

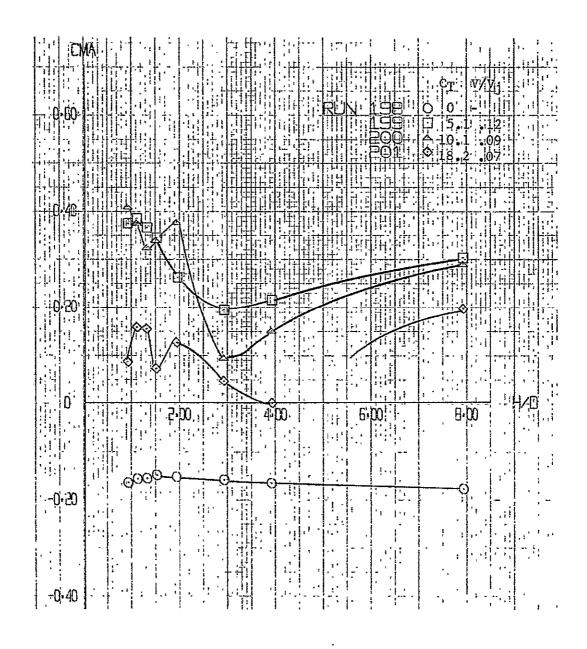


Figure A=91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\mathrm{N_{NOSe}}} = 80^{\mathrm{o}}$ ,  $\delta_{\mathrm{N_{Aft}}} = 90^{\mathrm{o}}$ ,  $\alpha = 0^{\mathrm{o}}$ ;  $\emptyset = +10^{\mathrm{o}}$  (Continued)

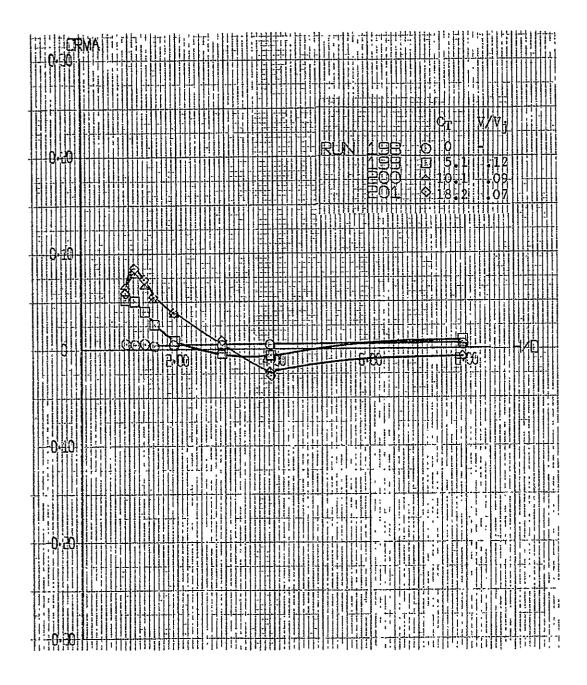


Figure A-91. Effect of Height on the Aerodynamic Coefficients at Various Thrust Levels, Ground Board Configuration 4;  $\delta_{\rm N_{NOSe}} = 80^{\rm o}, \ \delta_{\rm N_{Aft}} = 90^{\rm o}, \ \alpha = 0^{\rm o}; \ \emptyset = \pm 10^{\rm o} \ ({\rm Concluded})$ 

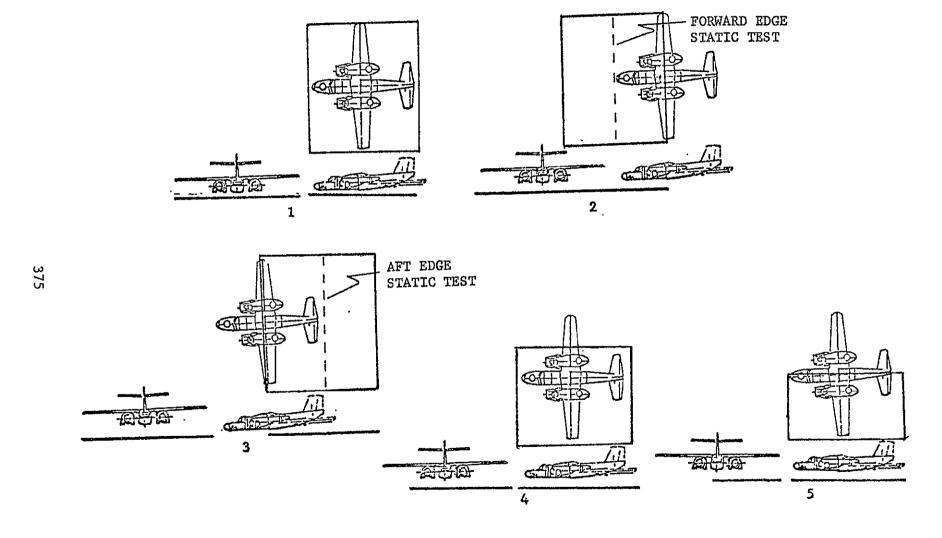


Figure A-92. Ground Board Configurations

## LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT-CRUISE-FAN V/STOL CONFIGURATION

Vearl R. Stewart Rockwell International Columbus Aircraft Division

APPENDIX B - STATIC THRUST STAND DATA

VOLUME II

TO SUMMARY REPORT CR 152247



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B~5	Static Test Data, Three Fan, $\delta_{N_{nose}} = 80^{\circ}$ , $\delta_{N_{aft}} = 90^{\circ}$ .	437
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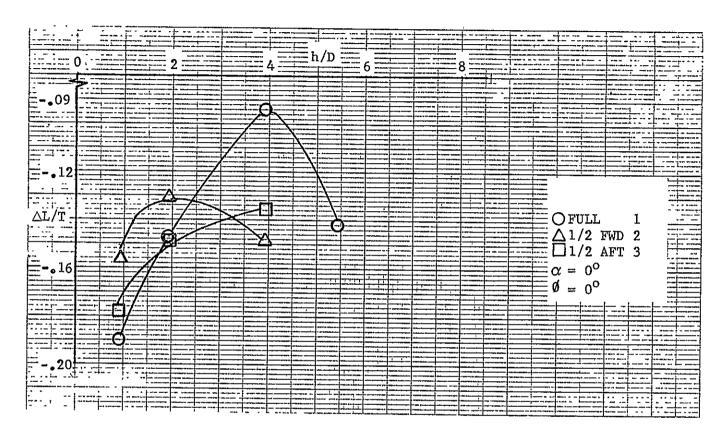


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  =  $105^{\rm o}$ 

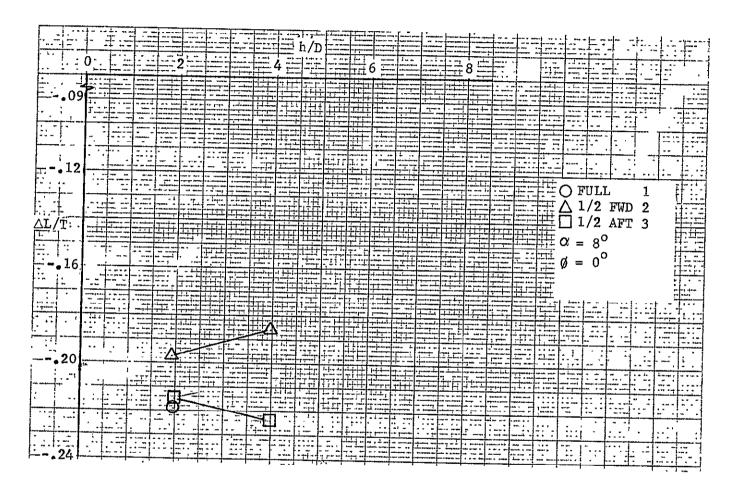


Figure B-1. Static Test Data, Four Fan,  $\delta_{\mathrm{N}}$  = 105 $^{\mathrm{O}}$  (Continued)

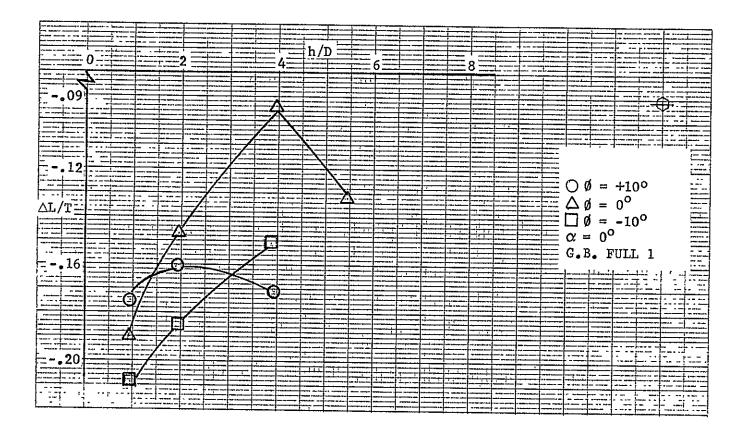


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105° (Continued)

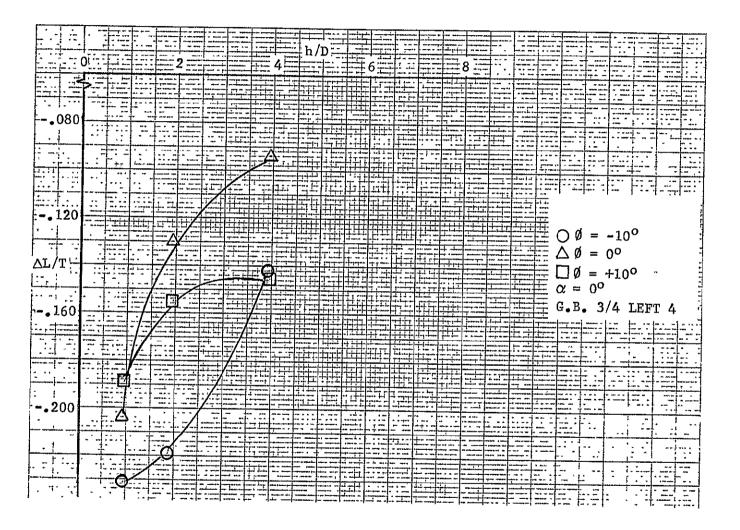


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105 $^{\rm o}$  (Continued)

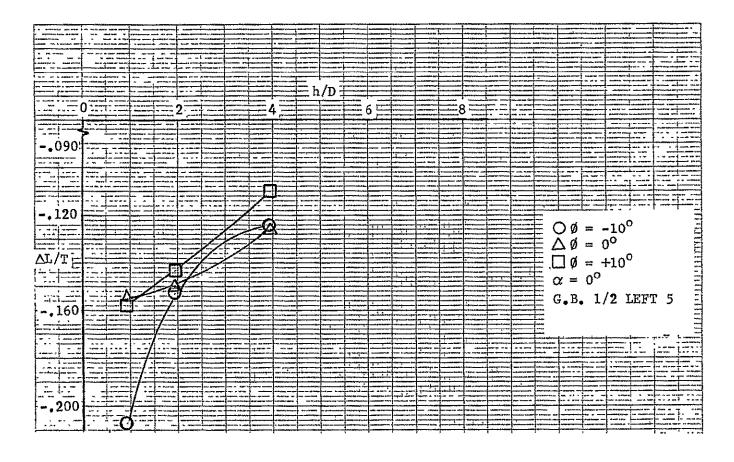


Figure B-1. Static Test Data, Four Fan,  $\delta_{\mathrm{N}}$  =  $105^{\mathrm{O}}$  (Continued)

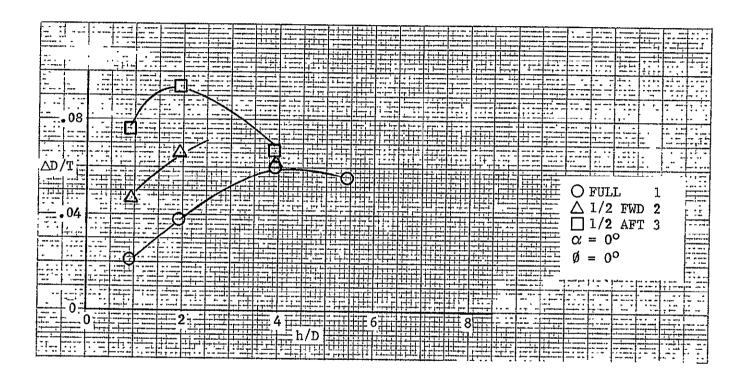


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105° (Continued)

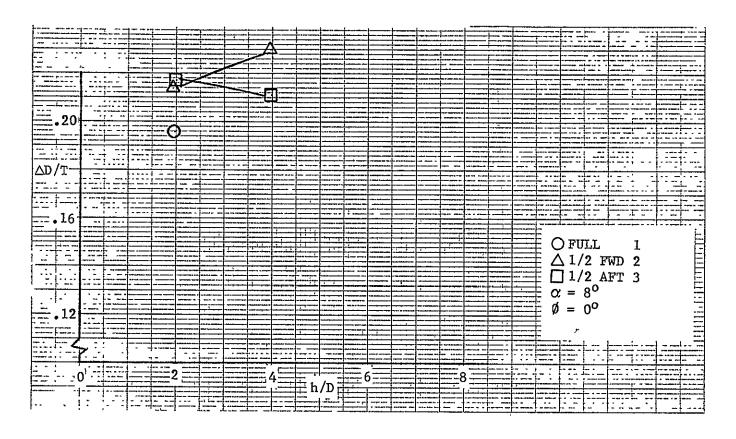


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105 $^{\rm O}$  (Continued)

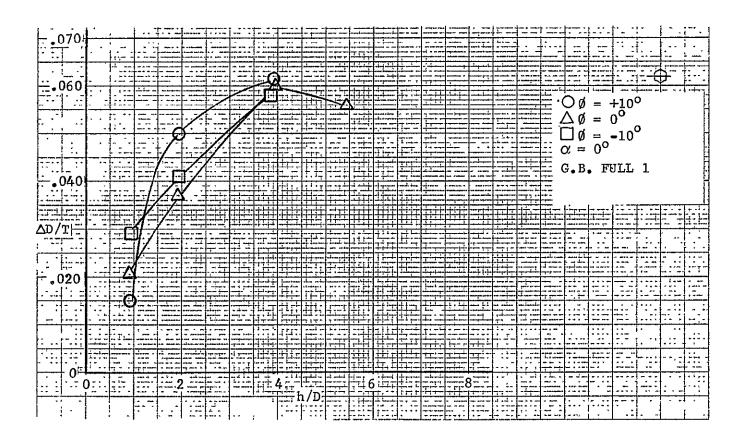


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N} = 105^{\rm O}$  (Continued)

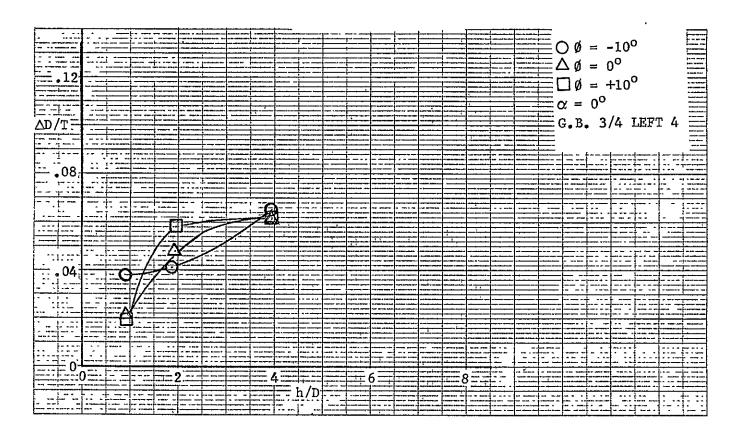


Figure B-1. Static Test Data, Four Fan,  $\delta_{\mathrm{N}}$  =  $105^{\mathrm{O}}$  (Continued)

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Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N} = 105^{\rm o}$  (Continued)

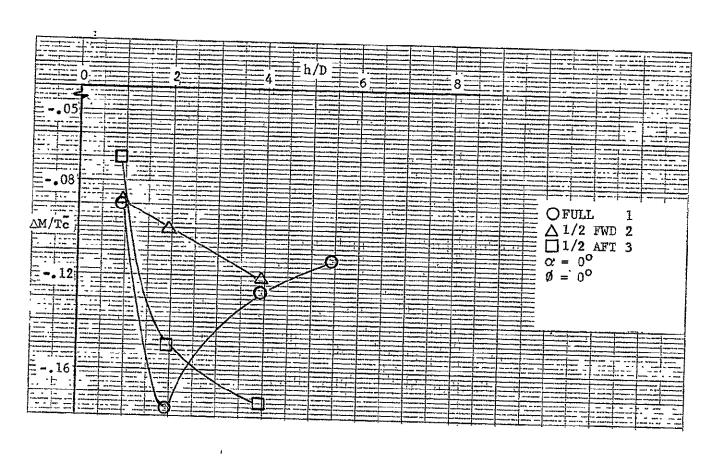


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N} = 105^{\rm O}$  (Continued)

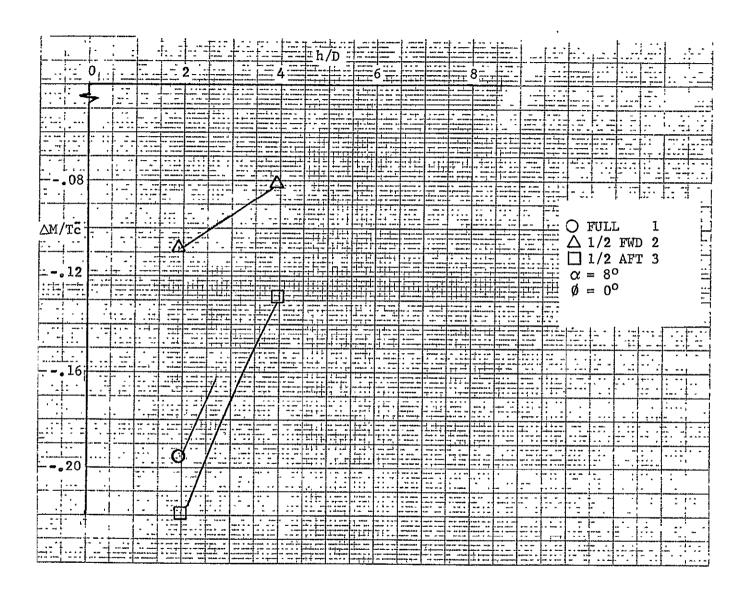


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105° (Continued)

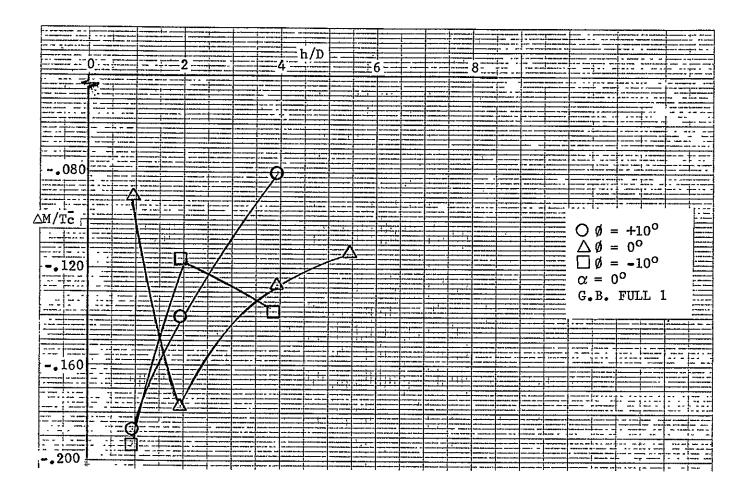


Figure B-1. Static Test Data, Four Fan,  $\delta_N = 105^{\circ}$  (Continued)

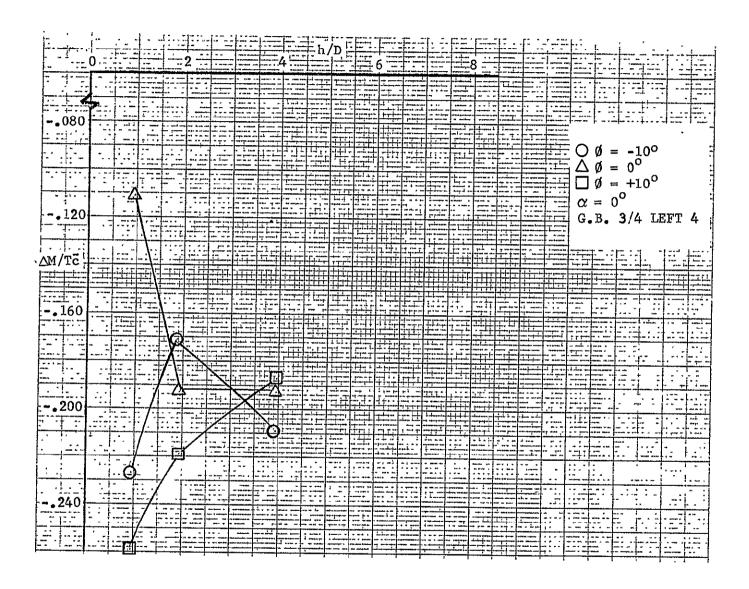


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105° (Continued)

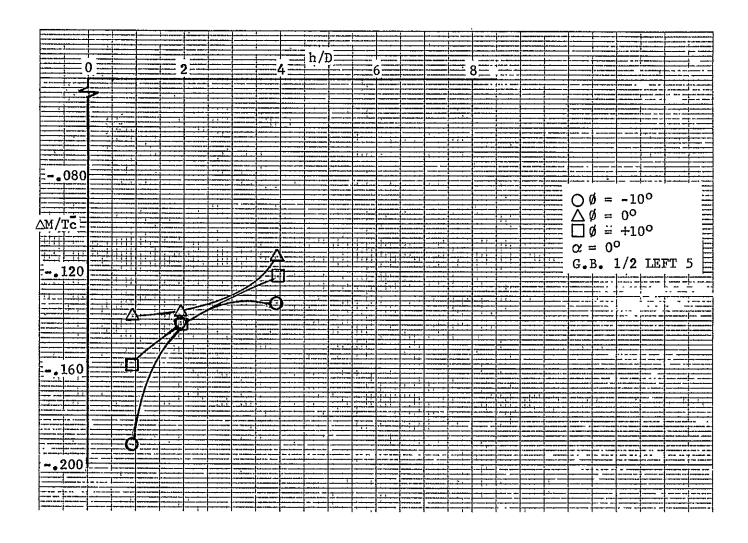


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 105° (Continued)

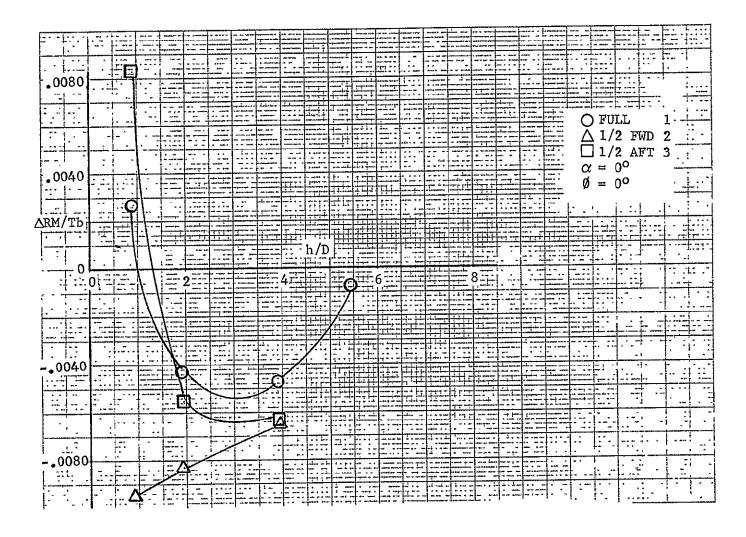


Figure B-1. Static Test Data, Four Fan,  $\delta_{
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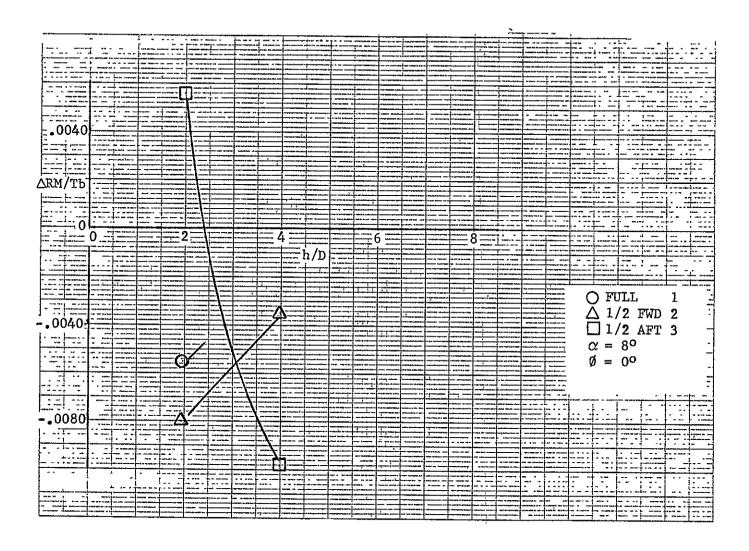


Figure B-1. Static Test Data, Four Fan,  $\delta_{
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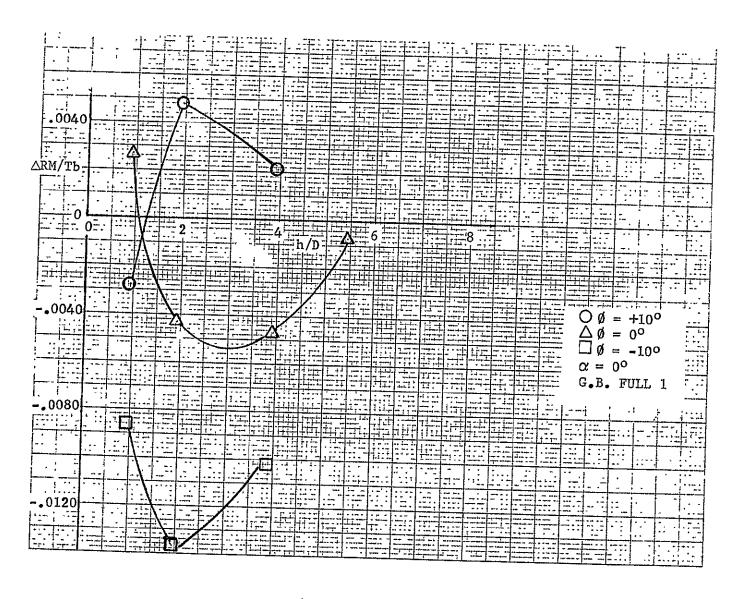


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N} = 105^{\rm o}$  (Continued)

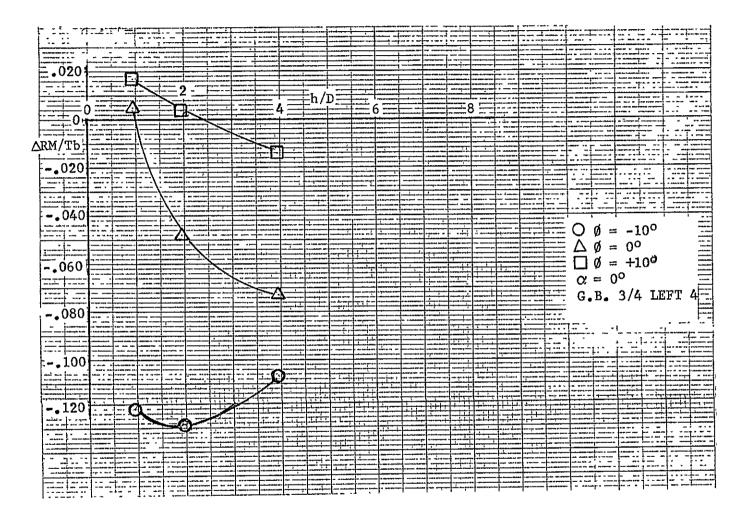


Figure B-1. Static Test Data, Four Fan,  $\delta_{
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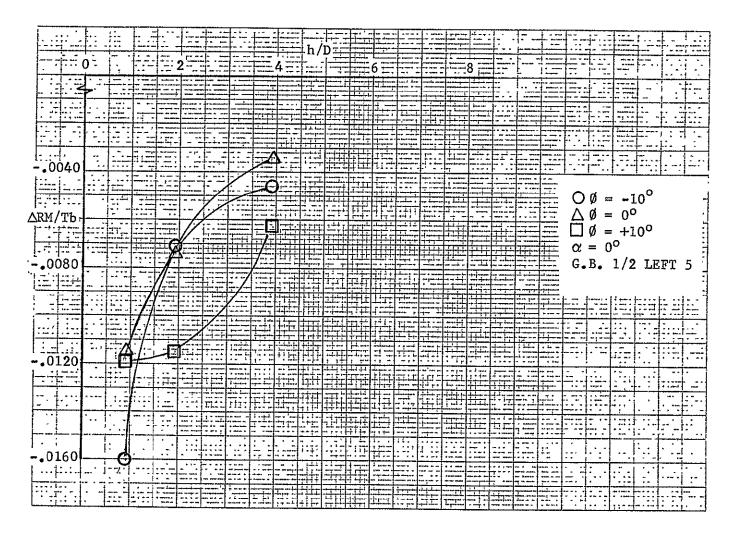


Figure B-1. Static Test Data, Four Fan,  $\delta_{\rm N} = 105^{\circ}$  (Concluded)

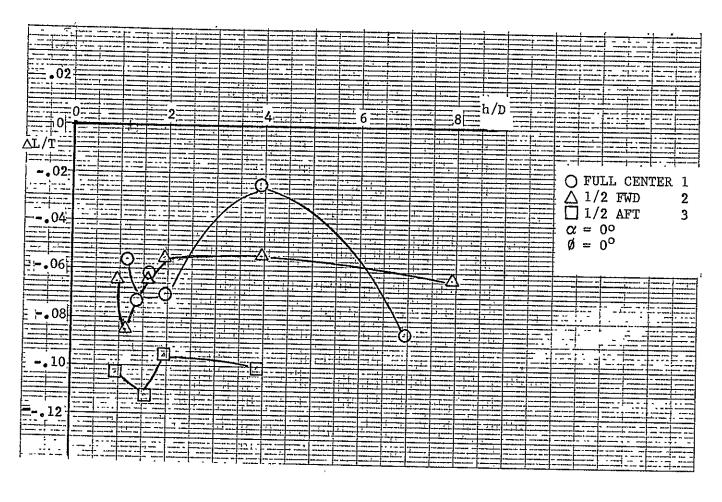


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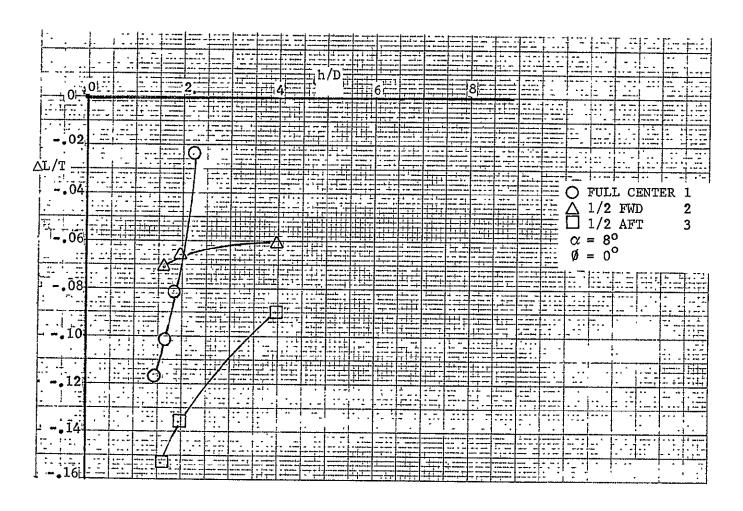


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}^{\ \ }$  = 90° (Continued)

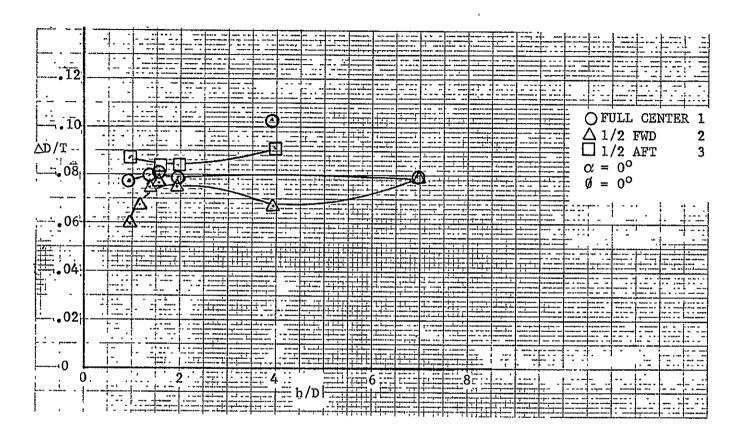


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90  $^{\rm O}$  (Continued)

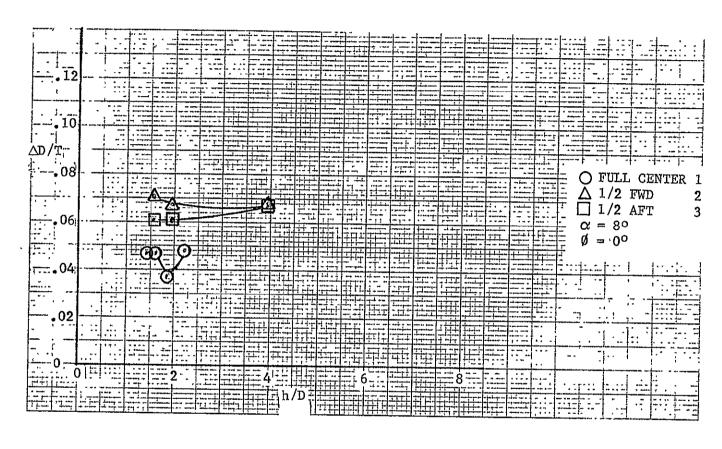


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90 $^{\rm O}$  (Continued)

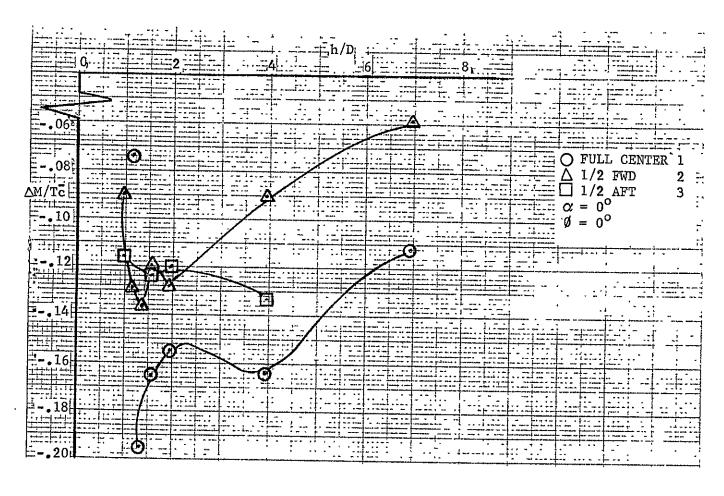


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90° (Continued)

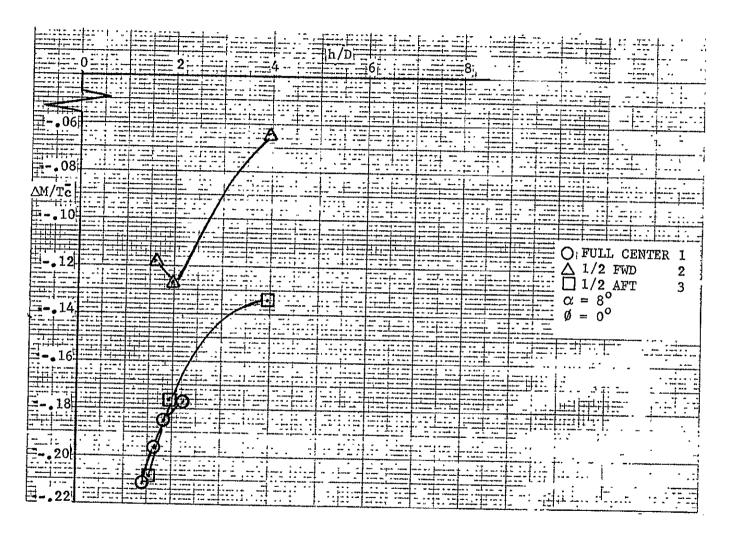


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90 $^{\rm O}$  (Continued)

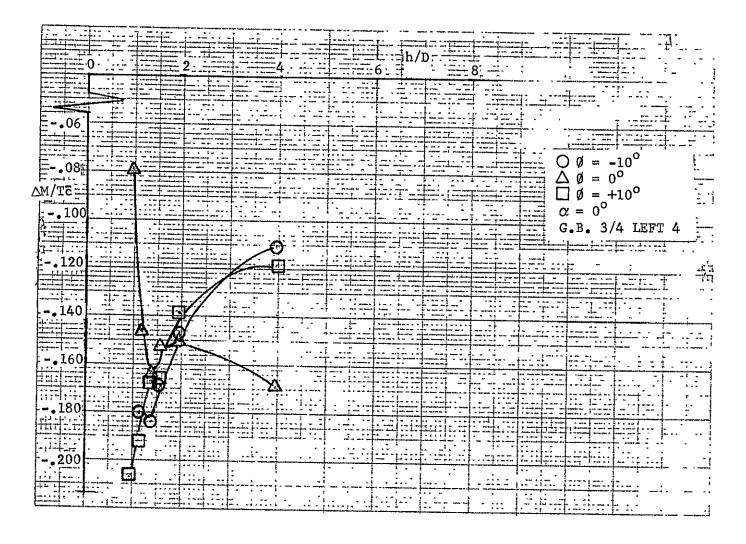


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90° (Continued)

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Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N} = 90^{\rm O}$  (Continued)



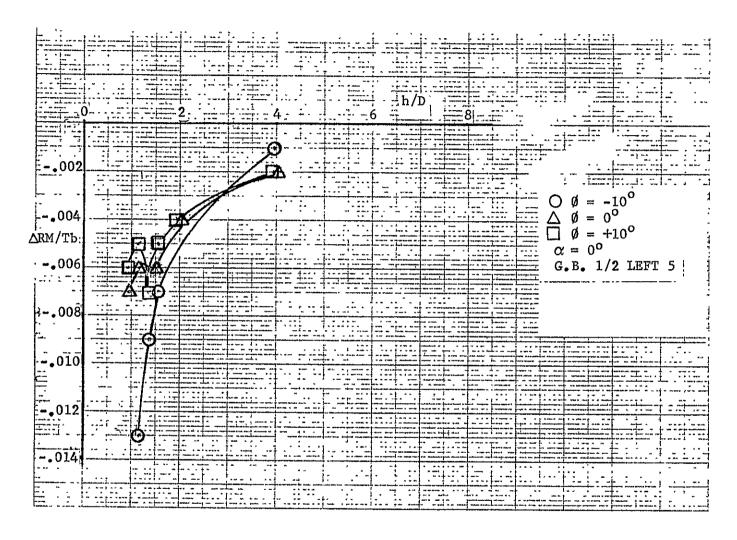


Figure B-2. Static Test Data, Four Fan,  $\delta_N = 90^{\circ}$  (Continued)

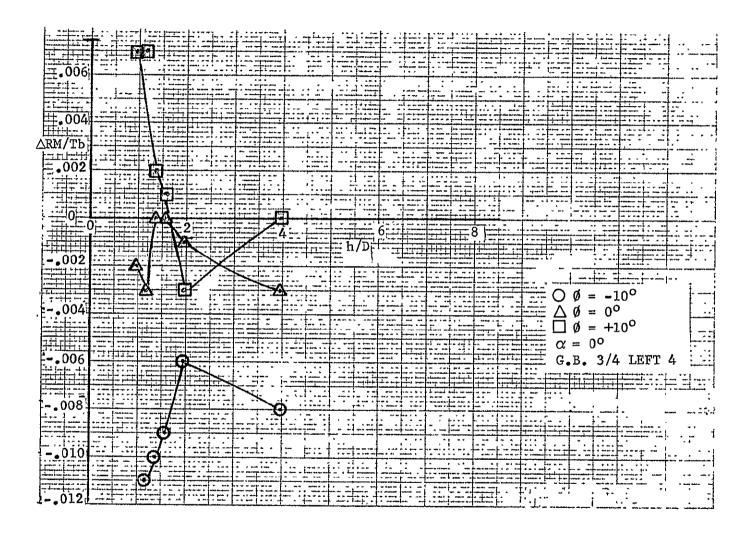


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90° (Continued)

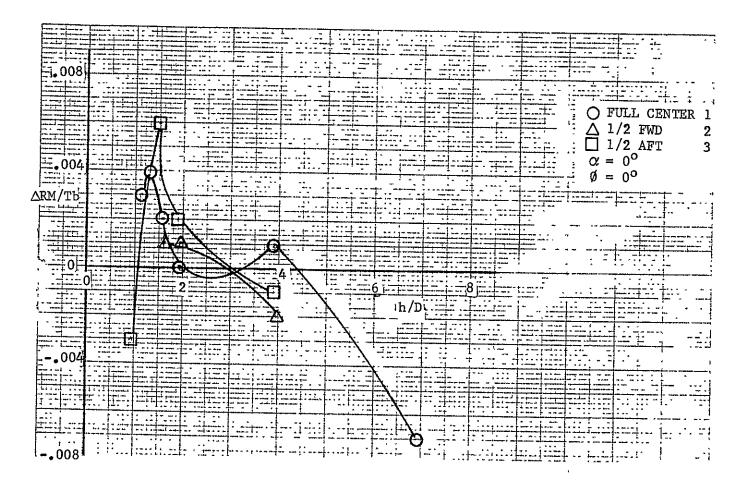


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N} = 90^{\rm O}$  (Continued)

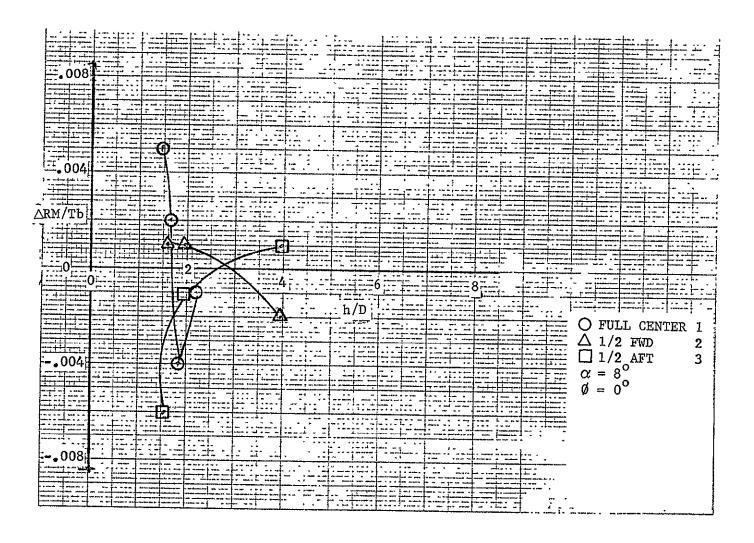


Figure B-2. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 90° (Concluded)

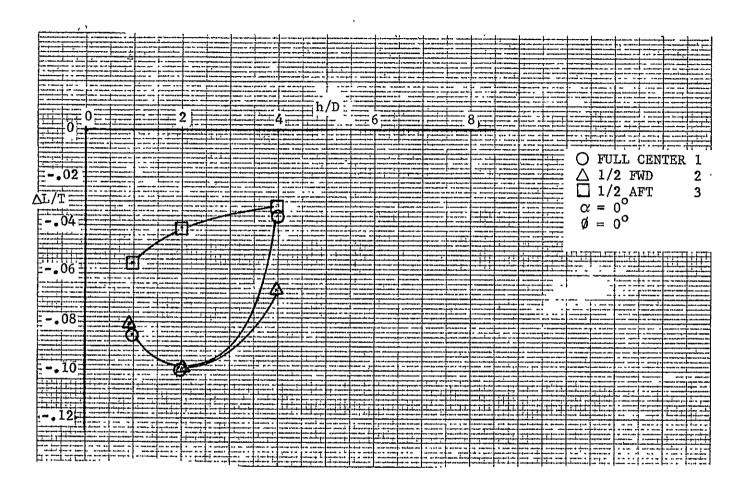


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N} = 80^{\rm O}$ 

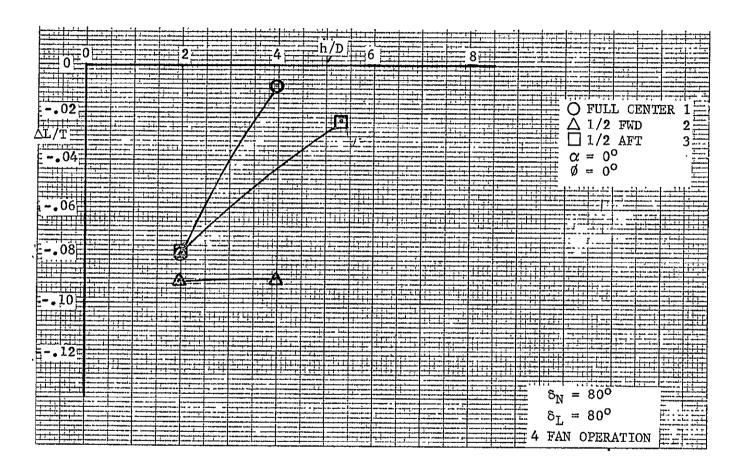


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  =  $80^{\rm O}$  (Continued)

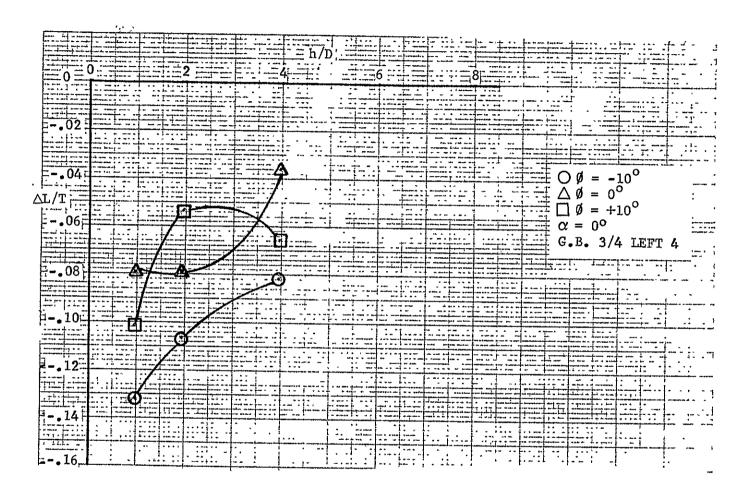


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80 $^{\rm O}$  (Continued)

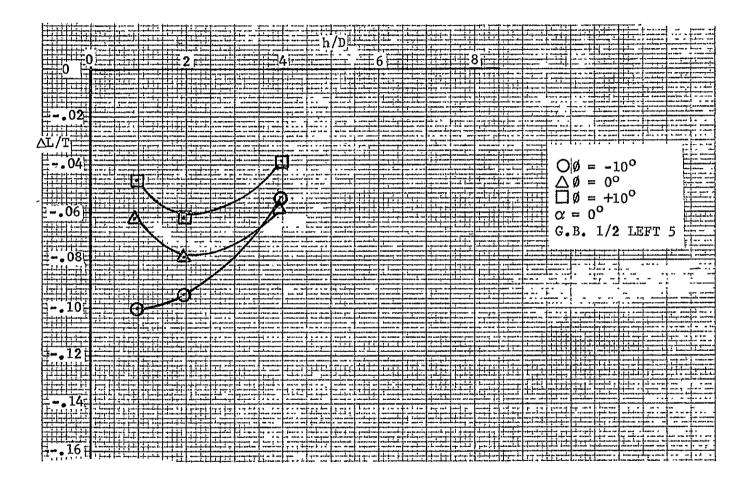


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  =  $80^{\rm O}$  (Continued)

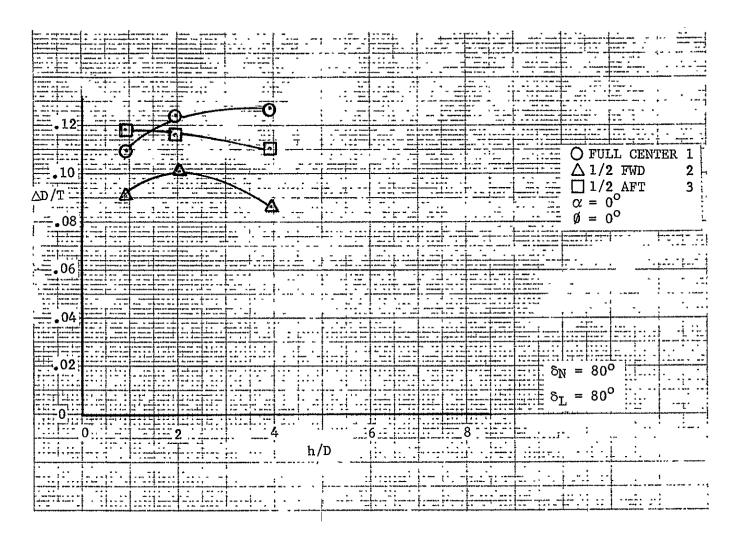


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  =  $80^{\rm O}$  (Continued)

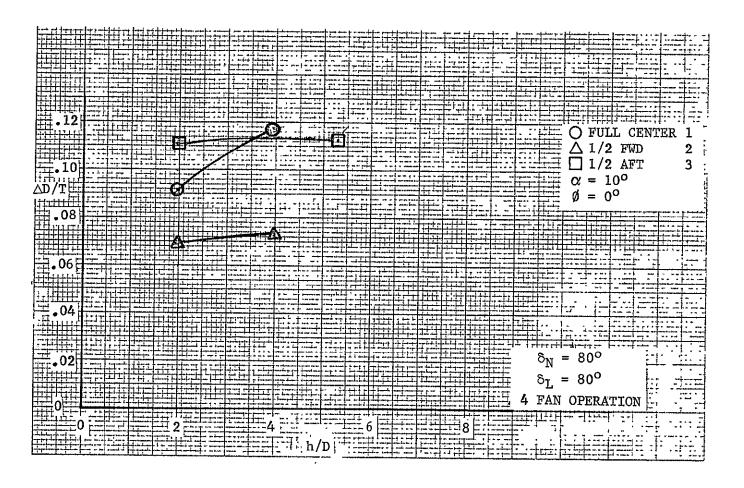


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}^{}=80^{\rm O}$  (Continued)



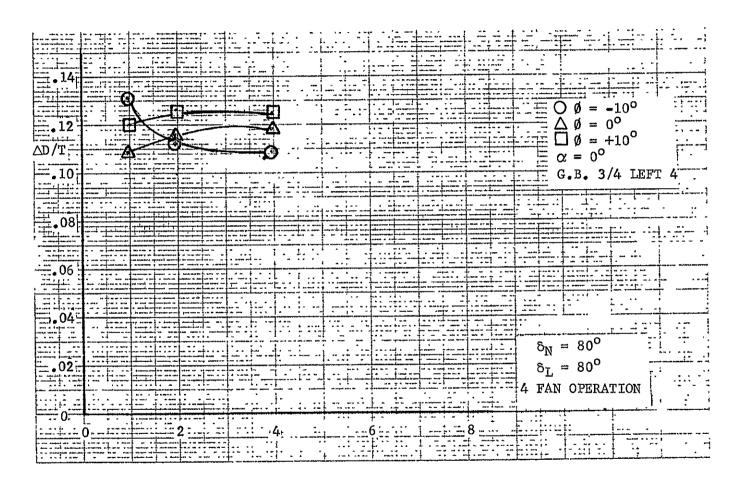


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N} = 80^{\rm O}$  (Continued)

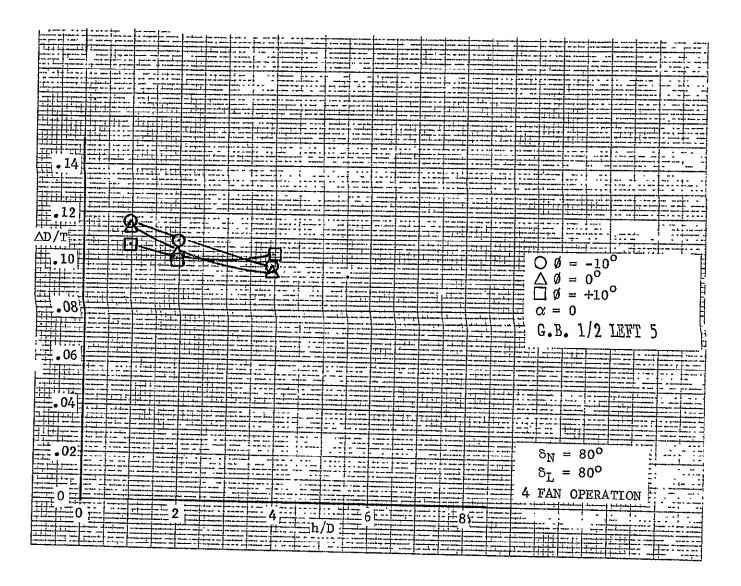


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80  $^{\rm O}$  (Continued)

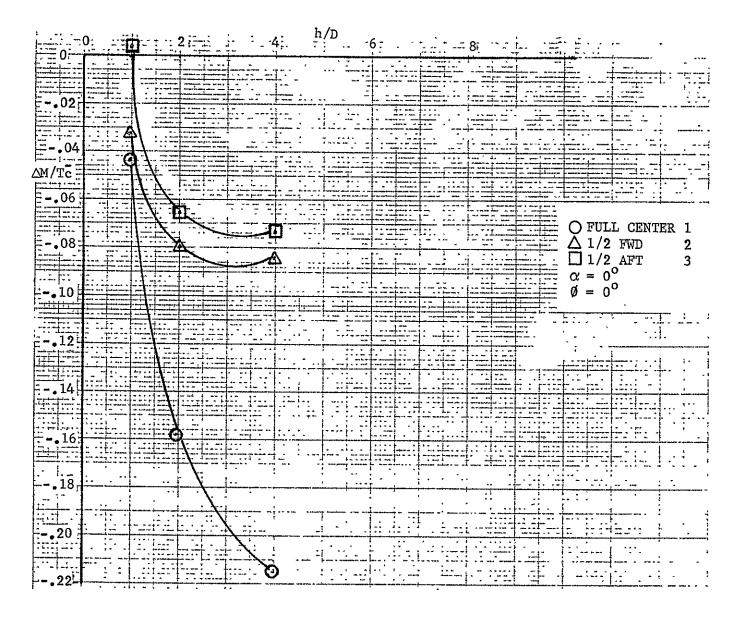


Figure B-3. Static Test Data, Four Fan,  $\delta_N = 80^{\circ}$  (Continued)

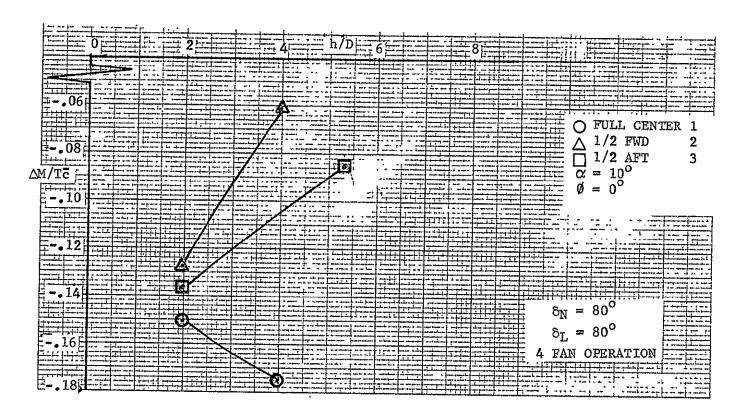


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80° (Continued)

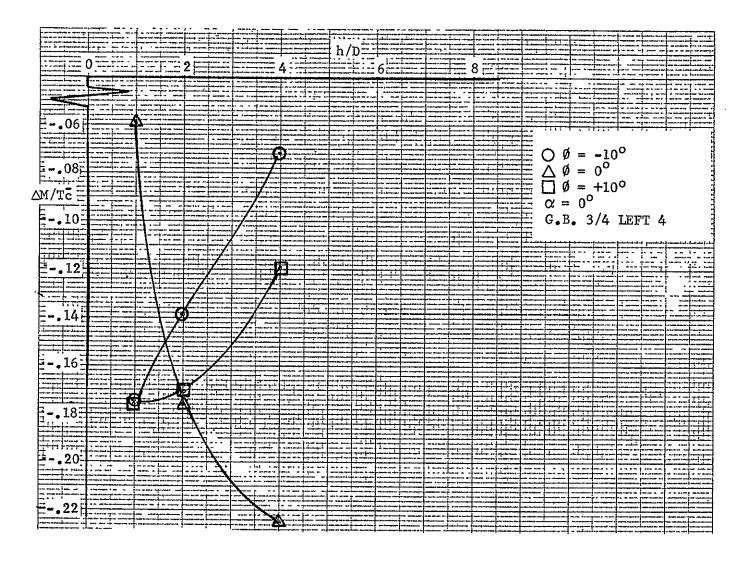


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  =  $80^{\rm O}$  (Continued)

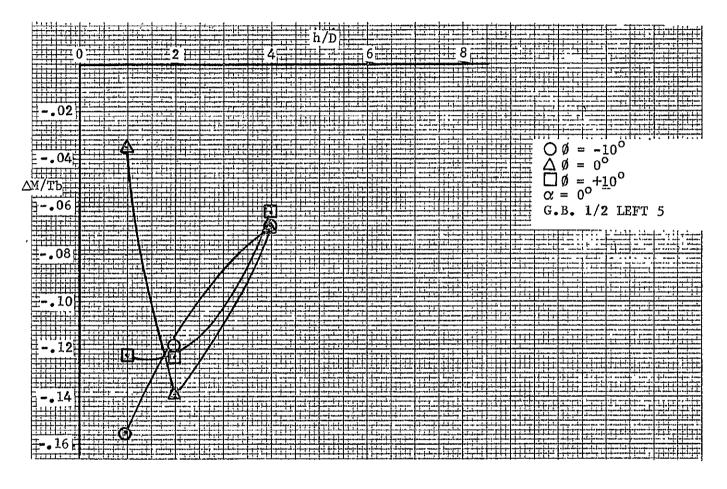


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80° (Continued)

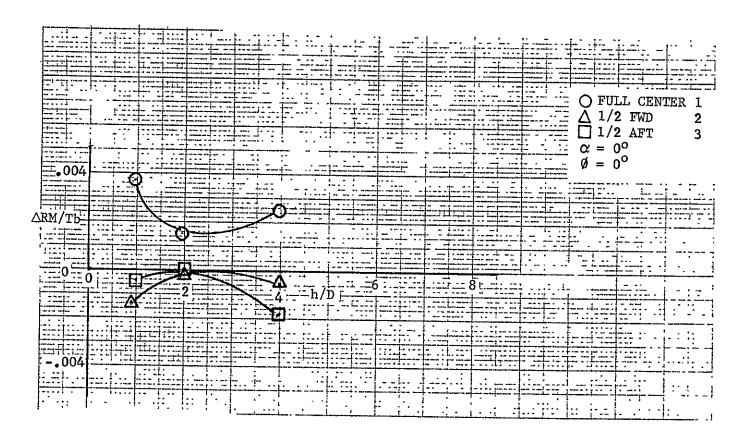


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80° (Continued)

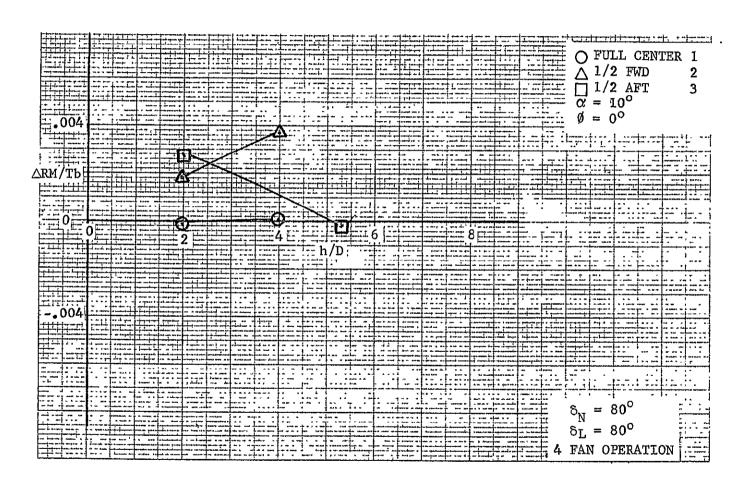


Figure B-3. Static Test Data, Four Fan,  $\delta_{\rm N}$  = 80° (Continued)

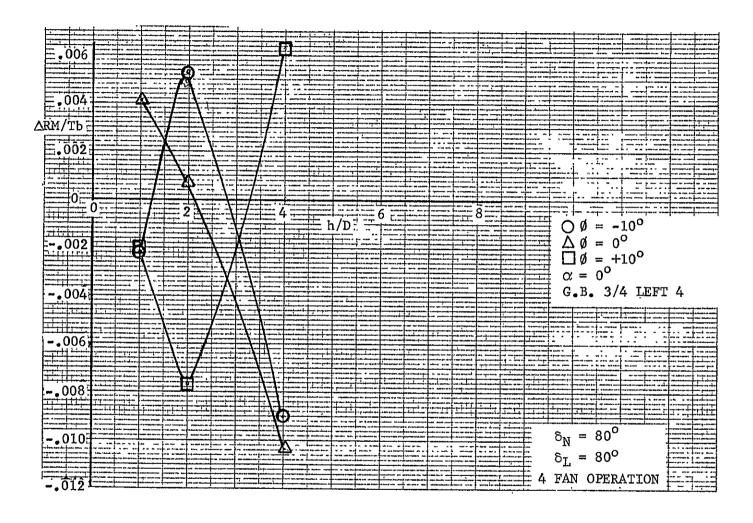


Figure B-3. Static Test Data, Four Fan,  $\delta_{xx} = 80^{\circ}$  (Continued)

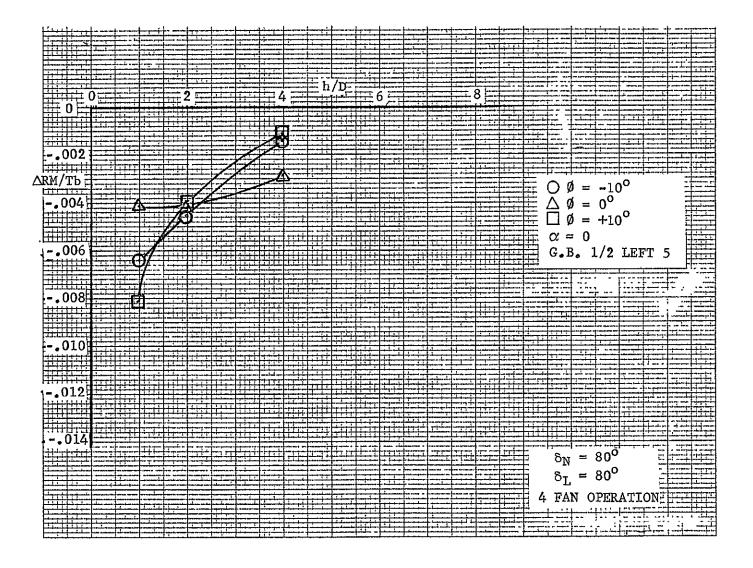


Figure B-3. Static Test Data, Four Fan,  $\delta_{\mathrm{N}}$  = 80 $^{\mathrm{O}}$  (Concluded)

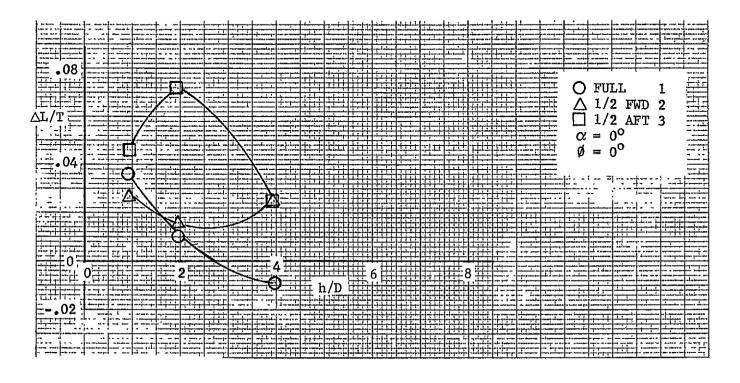


Figure B-4. Static Test Data Four Fan  $\delta N_{fwd}$  = 30°,  $\delta N_{aft}$  = 60°

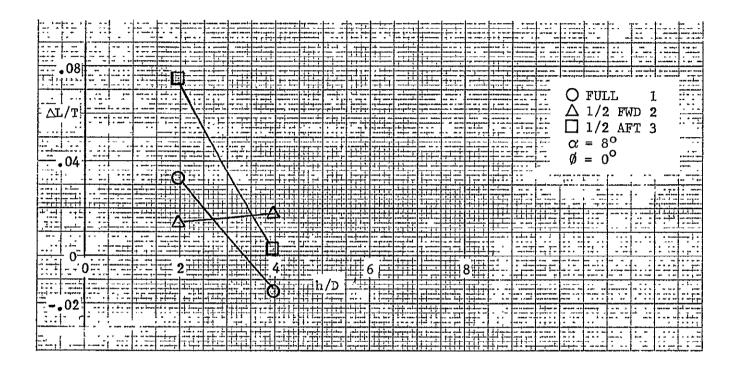


Figure B-4. Static Test Data Four Fan  $\delta_{N_{fwd}}$  = 30°,  $\delta_{N_{aft}}$  = 60° (Continued)

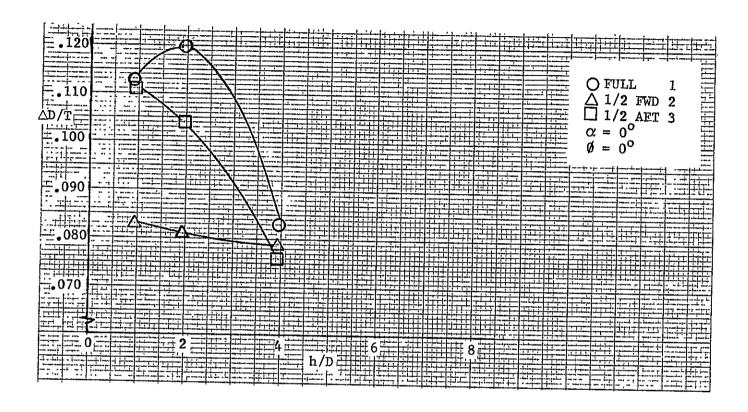


Figure B-4. Static Test Data Four Fan  $\delta N_{fwd}$  = 30°,  $\delta N_{aft}$  = 60° (Continued)

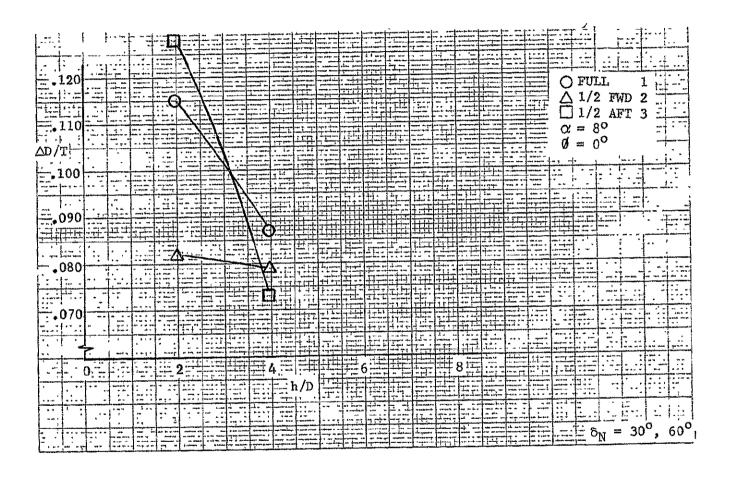


Figure B-4. Static Test Data Four Fan  $\delta_{N_{\mbox{fwd}}} = 30^{\circ}$ ,  $\delta_{N_{\mbox{aft}}} = 60^{\circ}$  (Continued)

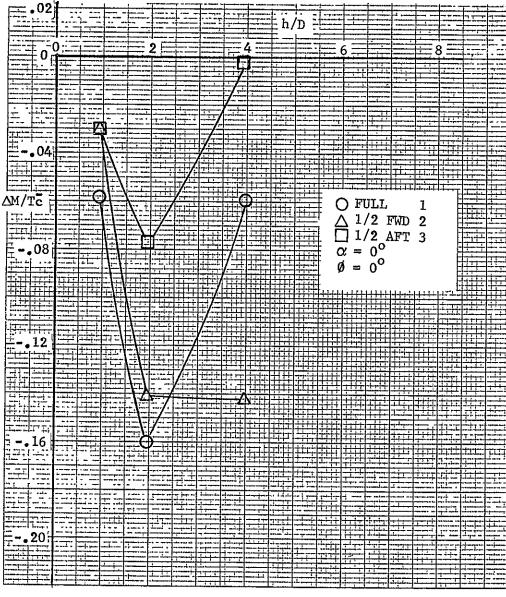


Figure B-4. Static Test Data Four Fan  $\delta_{\text{N}_{\text{fwd}}} = 30^{\circ}$ ,  $\delta_{\text{N}_{\text{aft}}} = 60^{\circ}$  (Continued)

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Figure B-4. Static Test Data Four Fan  $\delta_{N_{fwd}} = 30^{\circ}$ ,  $\delta_{N_{aft}} = 60^{\circ}$  (Continued)

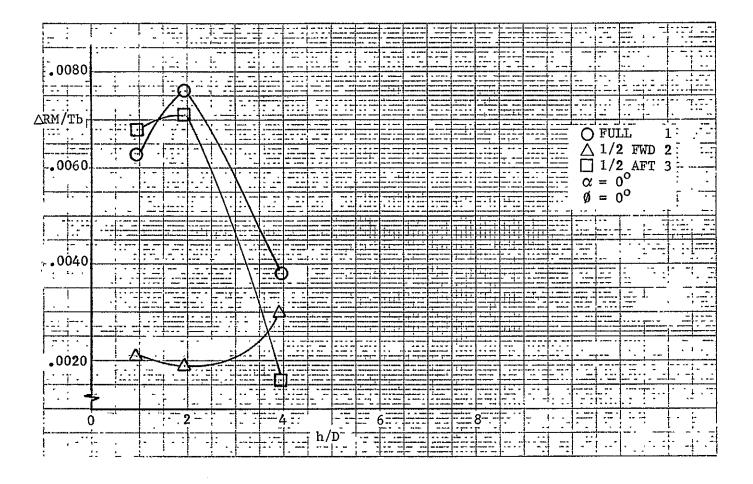


Figure B-4. Static Test Data Four Fan  $\delta_{\rm N_{fwd}}$  = 30°,  $\delta_{\rm N_{aft}}$  = 60° (Continued)

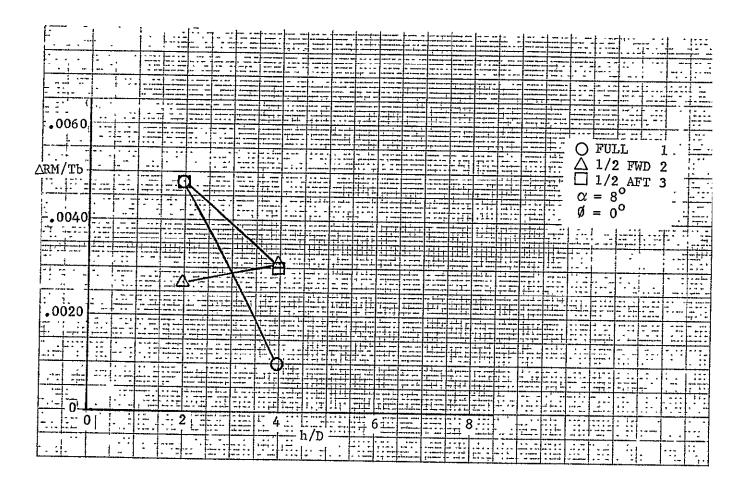


Figure B-4. Static Test Data Four Fan  $\delta_{\rm Nfwd}$  = 30°,  $\delta_{\rm Naft}$  = 60° (Continued)

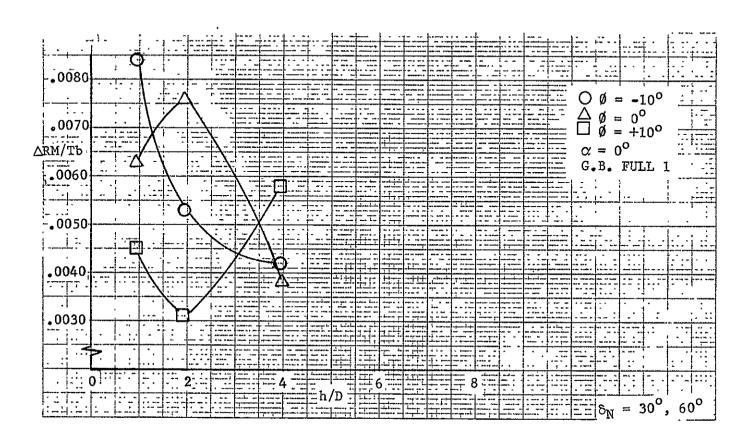


Figure B-4. Static Test Data Four Fan  $\delta_{N_{\mbox{fwd}}}$  = 30°,  $\delta_{N_{\mbox{aft}}}$  = 60° (Continued)

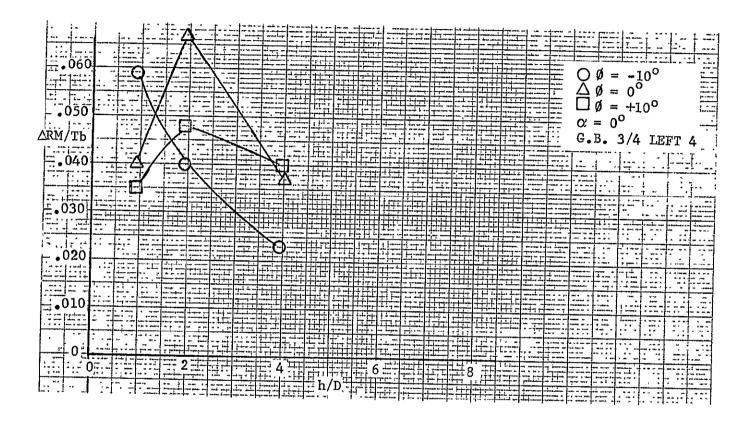


Figure B-4. Static Test Data Four Fan  $\delta_{N_{fwd}}$  = 30°,  $\delta_{N_{aft}}$  = 60° (Continued)

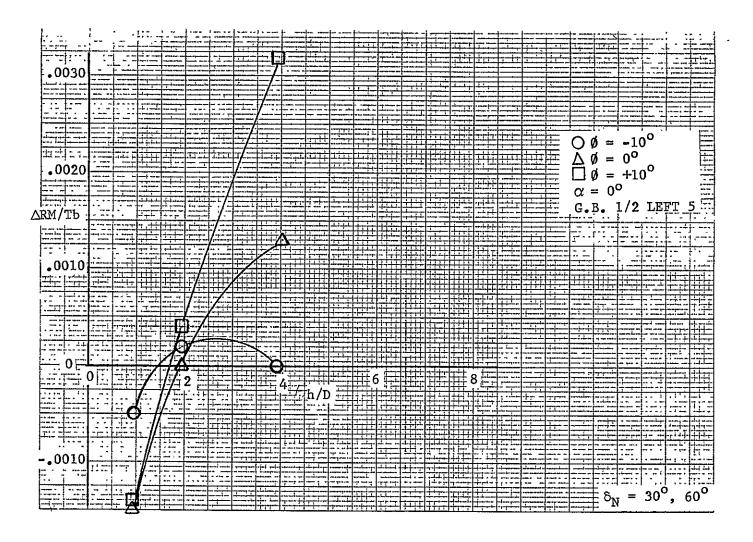


Figure B-4. Static Test Data Four Fan  $\delta_{\rm Nfwd}$  = 30°,  $\delta_{\rm Naft}$  = 60° (Concluded)

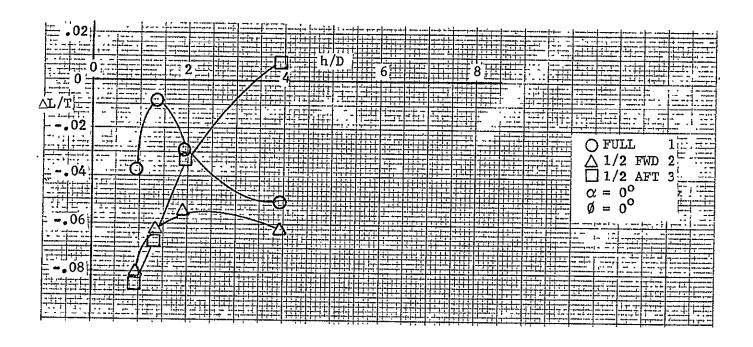


Figure B-5. Static Test Data Three Fan  $\delta_{\rm N_{nose}}$  = 80°,  $\delta_{\rm N_{aft}}$  = 90°

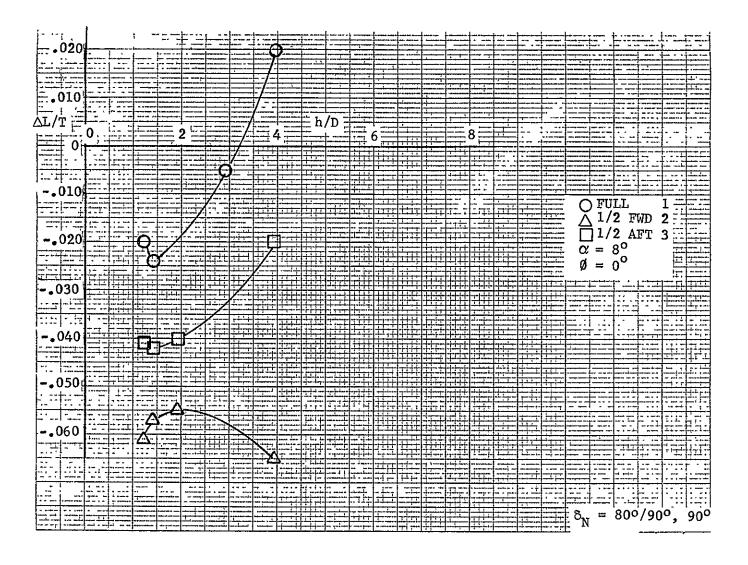


Figure B-5. Static Test Data Three Fan  $\delta_{\rm N_{nose}}$  = 80°,  $\delta_{\rm N_{aft}}$  = 90° (Continued)

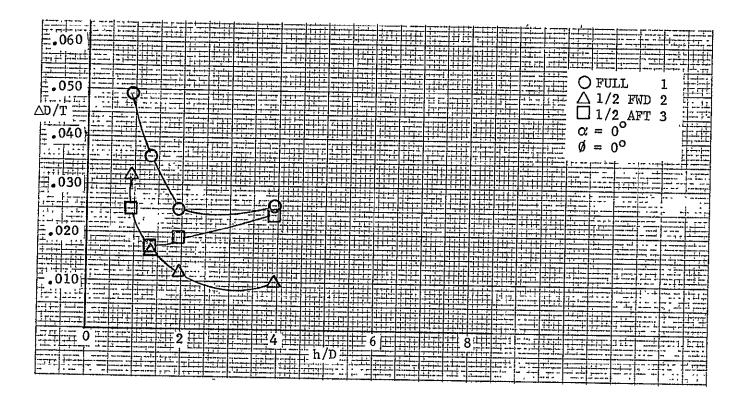


Figure B-5. Static Test Data Three Fan  $\delta_{\text{Nnose}} = 80^{\circ}$ ,  $\delta_{\text{Naft}} = 90^{\circ}$  (Continued)

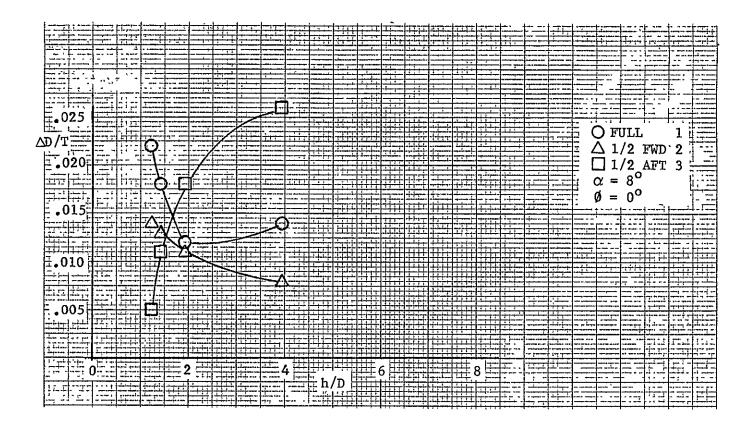


Figure B-5. Static Test Data Three Fan  $\delta_{\text{N}_{\text{nose}}}$  = 80°,  $\delta_{\text{N}_{\text{aft}}}$  = 90° (Continued)

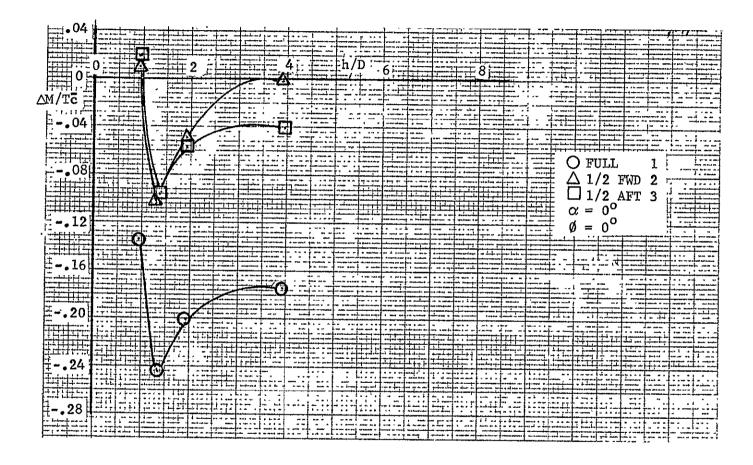


Figure B-5. Static Test Data Three Fan  $\delta_{\rm N_{nose}}$  = 80°,  $\delta_{\rm N_{aft}}$  = 90° (Continued)

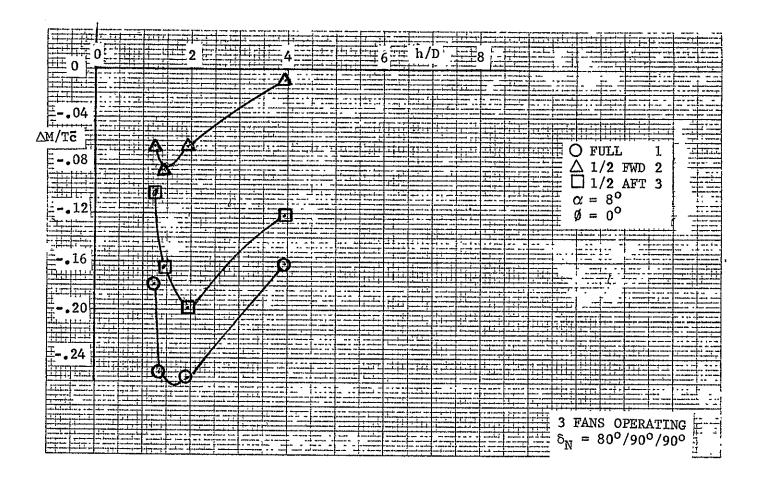


Figure B-5. Static Test Data Three Fan  $\delta_{\text{N}_{\text{nose}}}$  = 80°,  $\delta_{\text{N}_{\text{aft}}}$  = 90° (Continued)



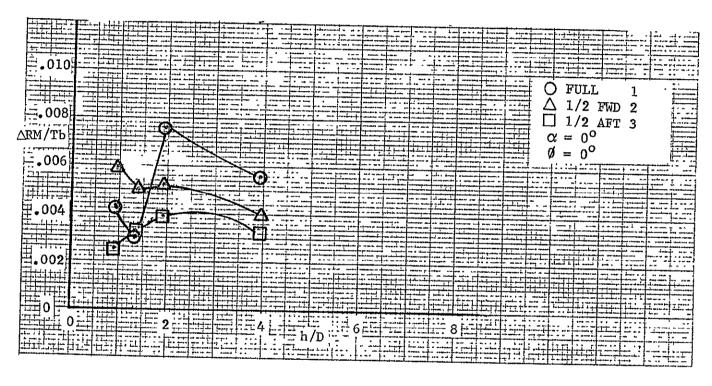


Figure B-5. Static Test Data Three Fan  $\delta_{\rm N_{nose}}$  = 80°,  $\delta_{\rm N_{aft}}$  = 90° (Continued)

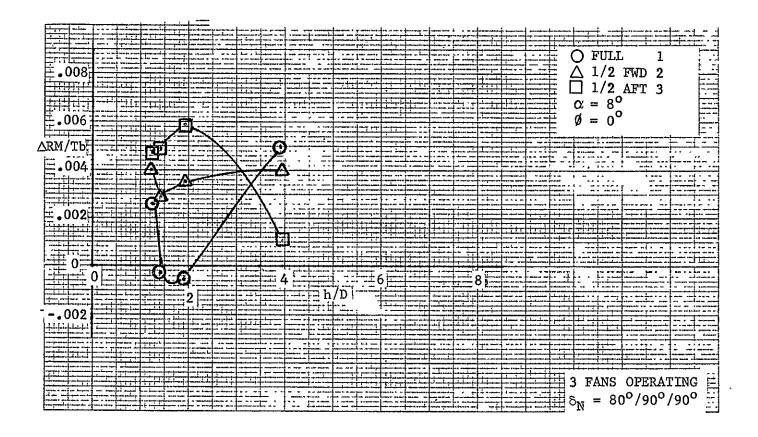


Figure B-5. Static Test Data Three Fan  $\delta_{\mathrm{N_{nose}}}$  = 80°,  $\delta_{\mathrm{N_{aft}}}$  = 90° (Continued)

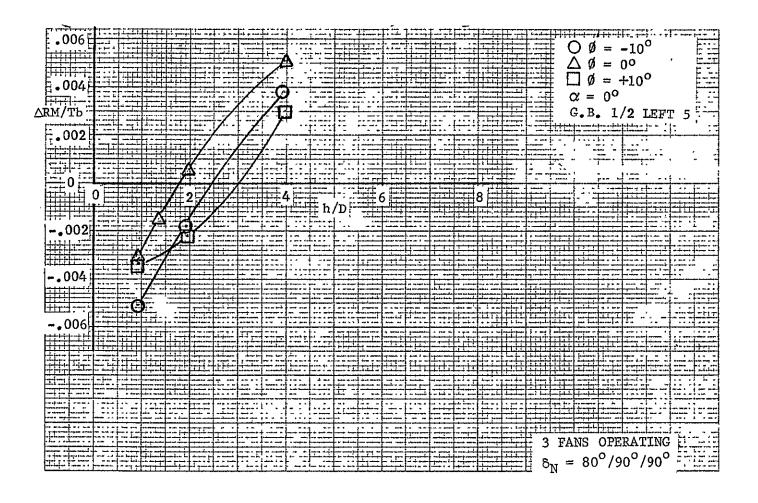


Figure B-5. Static Test Data Three Fan  $\delta_{\rm N_{nose}}$  = 80°,  $\delta_{\rm N_{aft}}$  = 90° (Concluded)

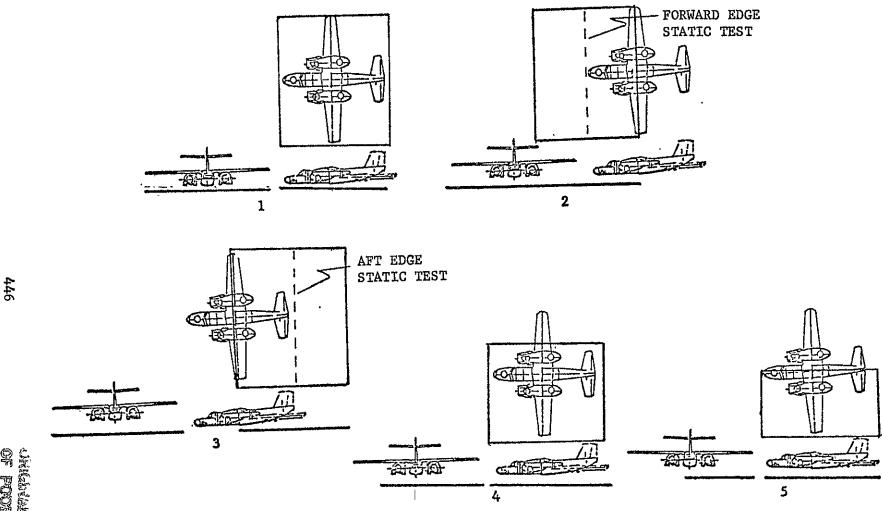


Figure B-6. Ground Board Configurations

## LOW SPEED WIND TUNNEL TEST OF GROUND PROXIMITY AND DECK EDGE EFFECTS ON A LIFT-CRUISE-FAN V/STOL CONFIGURATION

Vearl R. Stewart Rockwell International Columbus Aircraft Division

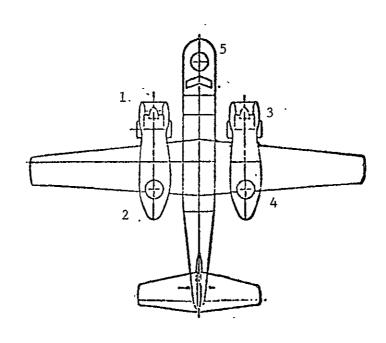
APPENDIX C - FAN CALIBRATION DATA

VOLUME II

TO SUMMARY REPORT CR-152247

## LIST OF ILLUSTRATIONS

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C-3	Fan Calibration Data, Fan #2, Ser. No. 366	455
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C-5	Fan Calibration Data, Fan #4, Ser. No. 367	465
C=6	Fan Calibration Data, Fan #5, Ser. No. 421	475



Fan No.	Ser. No.	Location
1	364	Left Hand Nacelle Forward
2	366	Left Hand Nacelle Aft
3	365	Right Hand Nacelle Forward
4	36 7	Right Hand Nacelle Aft
<b>5</b>	421	Nose

Figure C-1. Fan Nomenclature



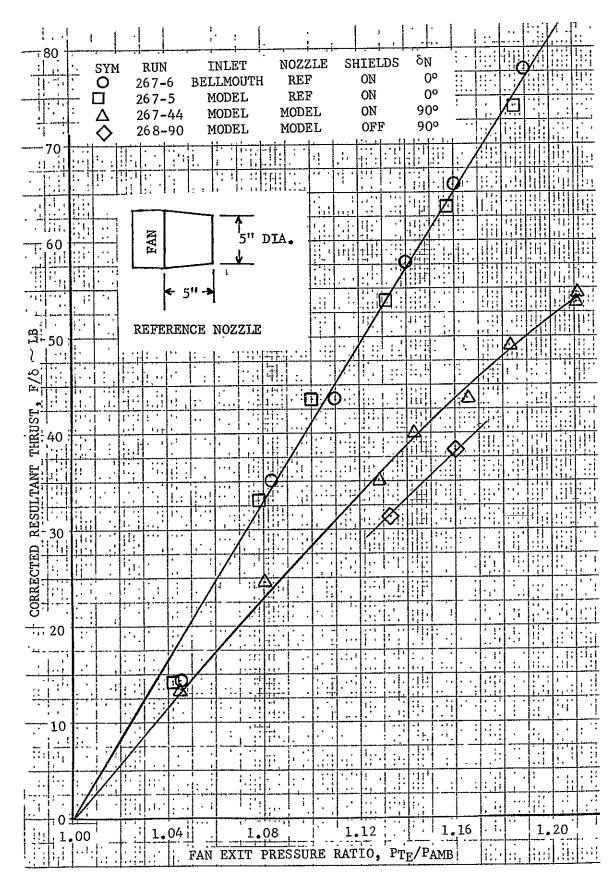


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364

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Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

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Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

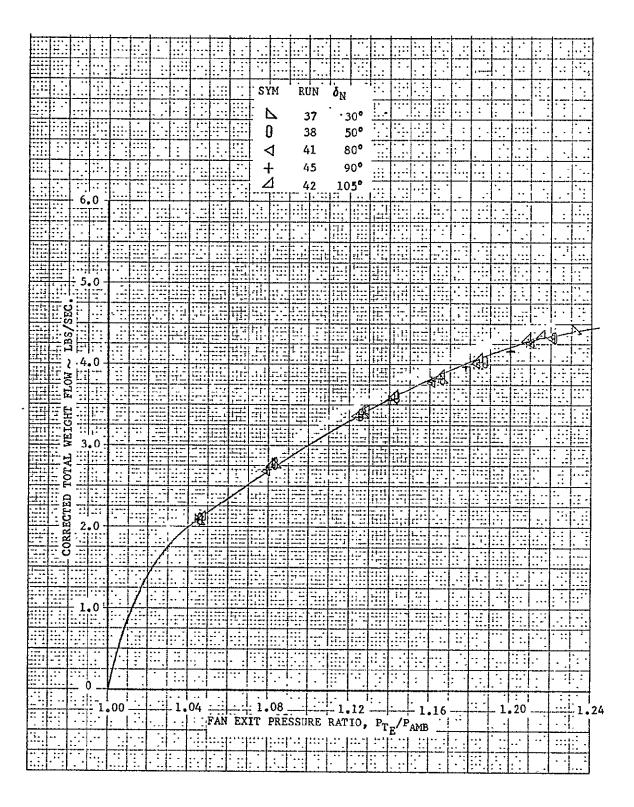


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Continued)

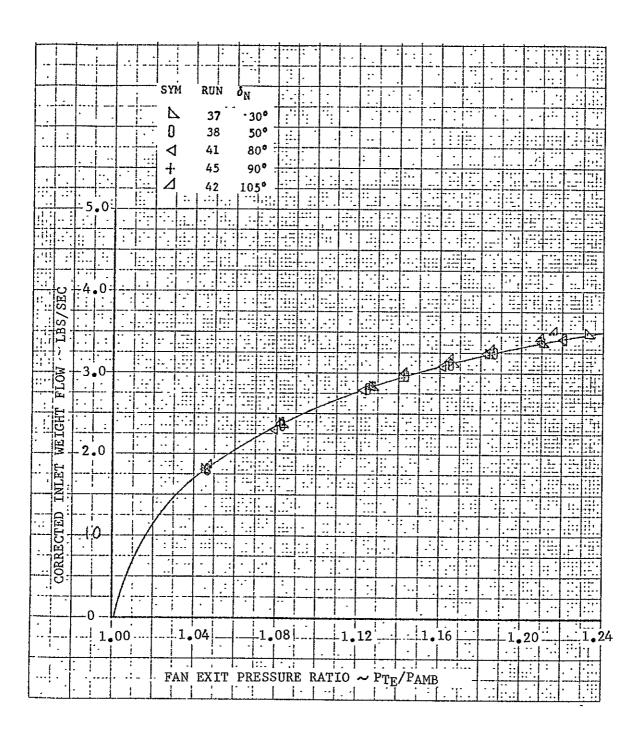


Figure C-2. Fan Calibration, Fan No. 1, Ser. No. 364 (Concluded)

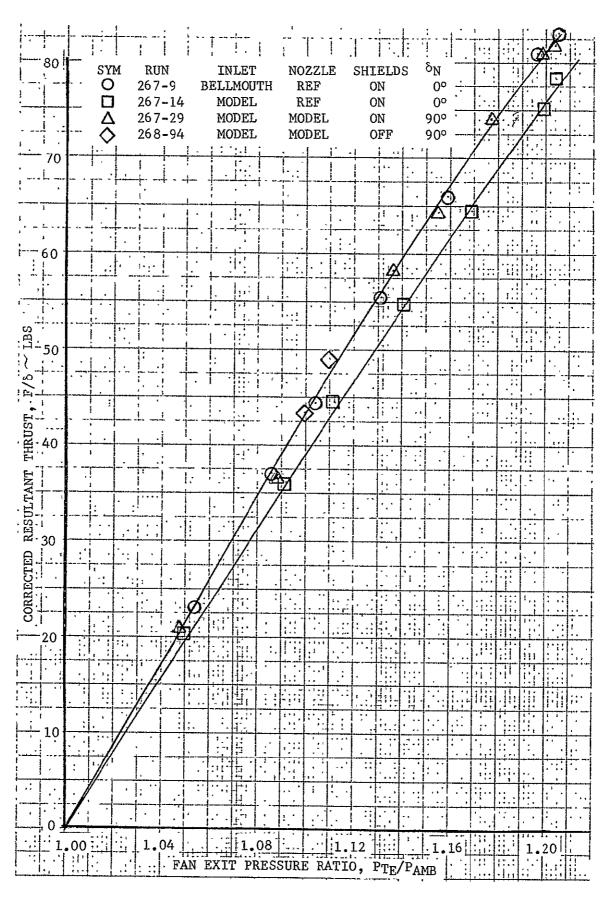


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366

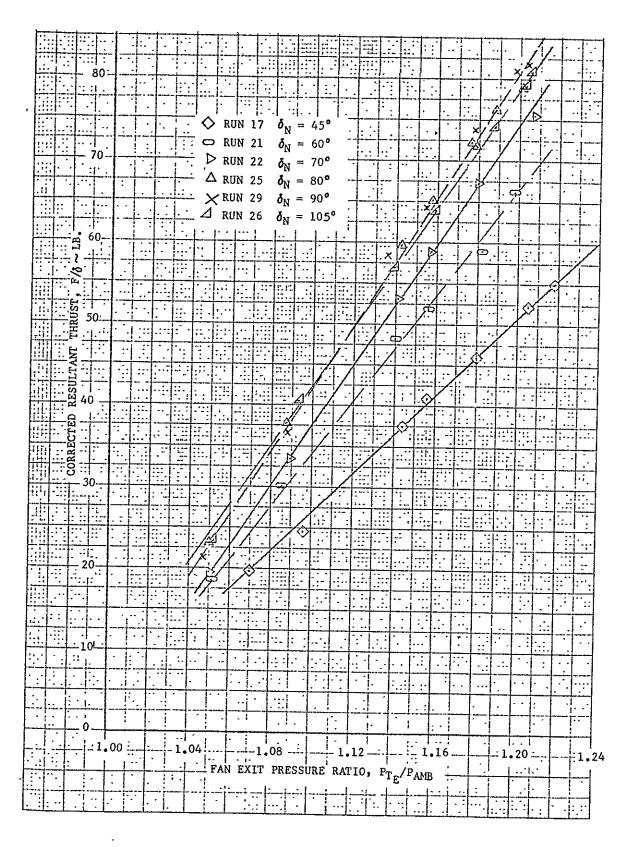


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

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Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

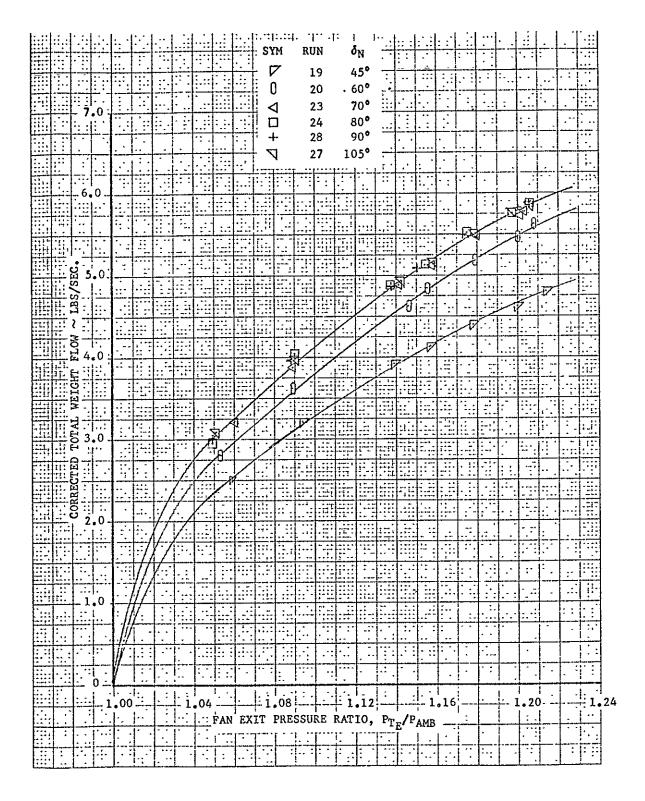


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Continued)

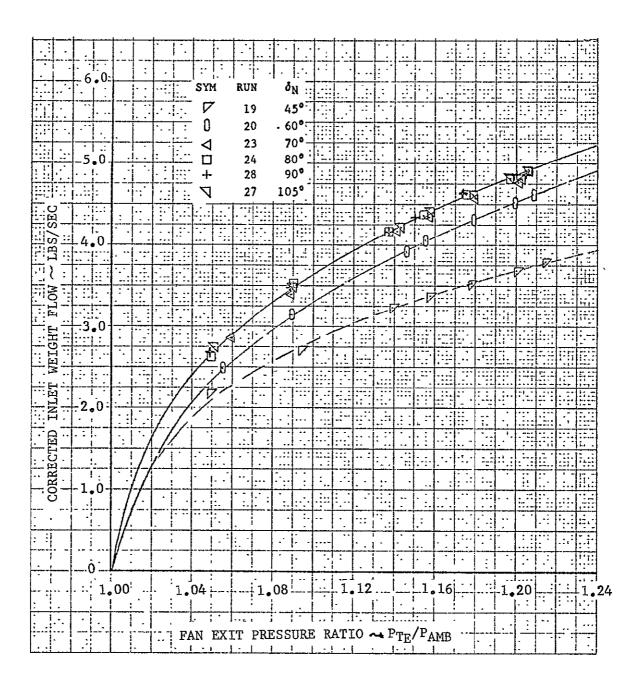


Figure C-3. Fan Calibration, Fan No. 2, Ser. No. 366 (Concluded)

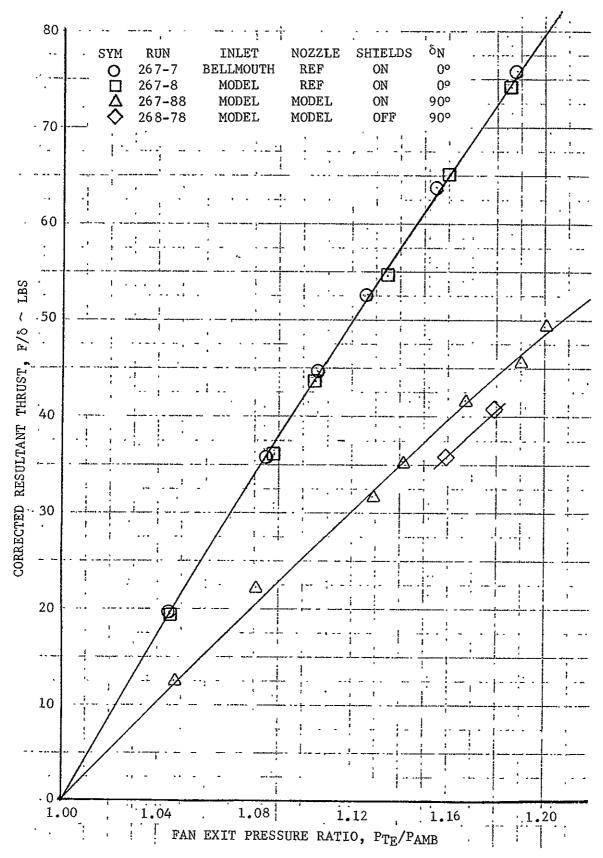


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365

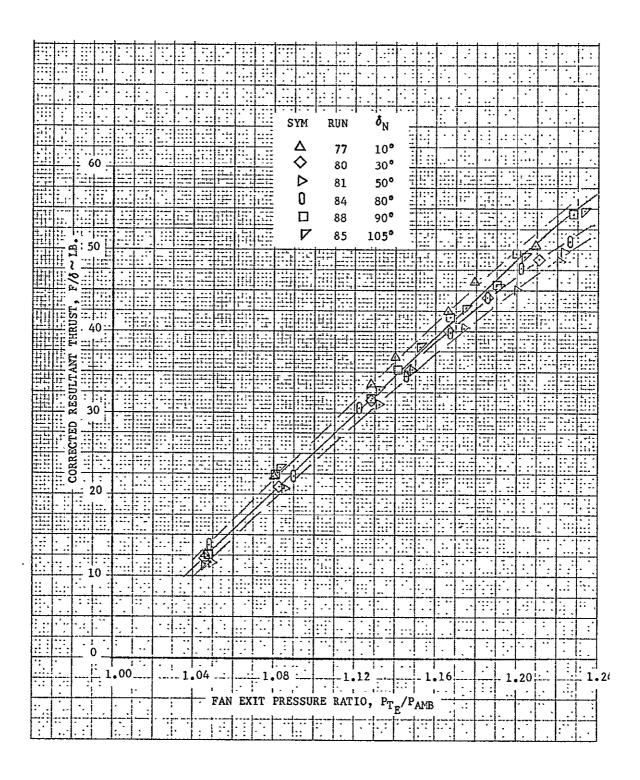


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

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Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

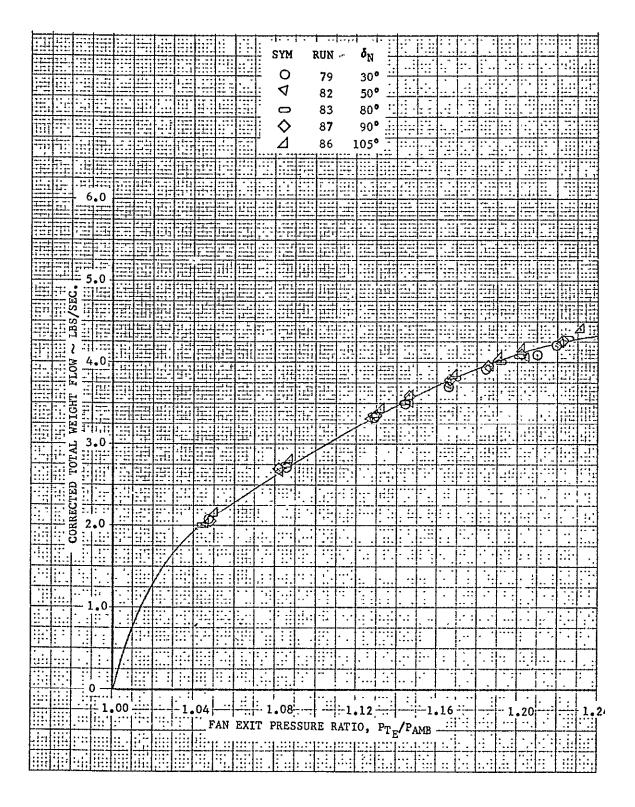


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Continued)

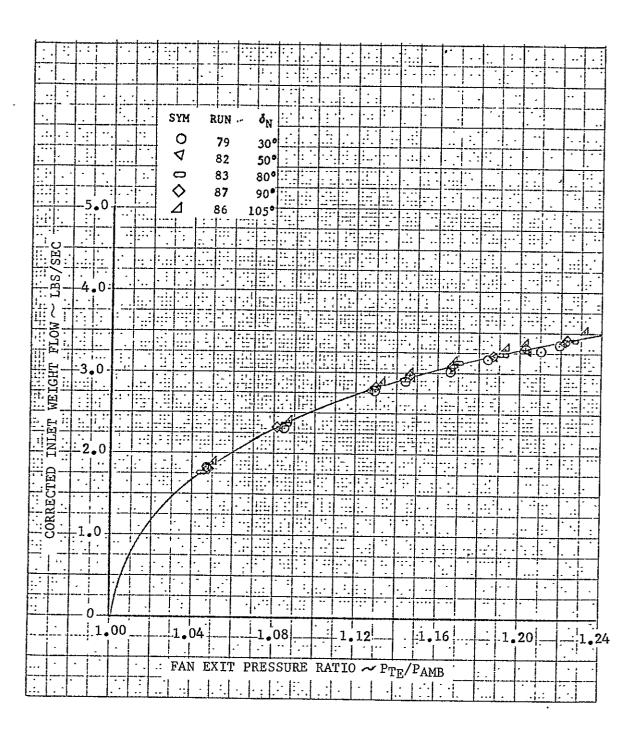


Figure C-4. Fan Calibration, Fan No. 3, Ser. No. 365 (Concluded)

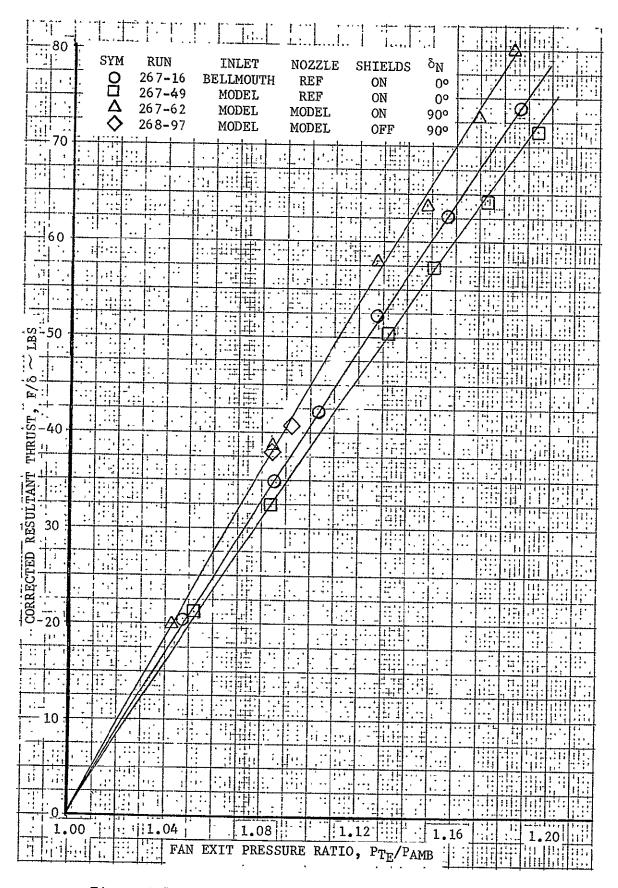


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367

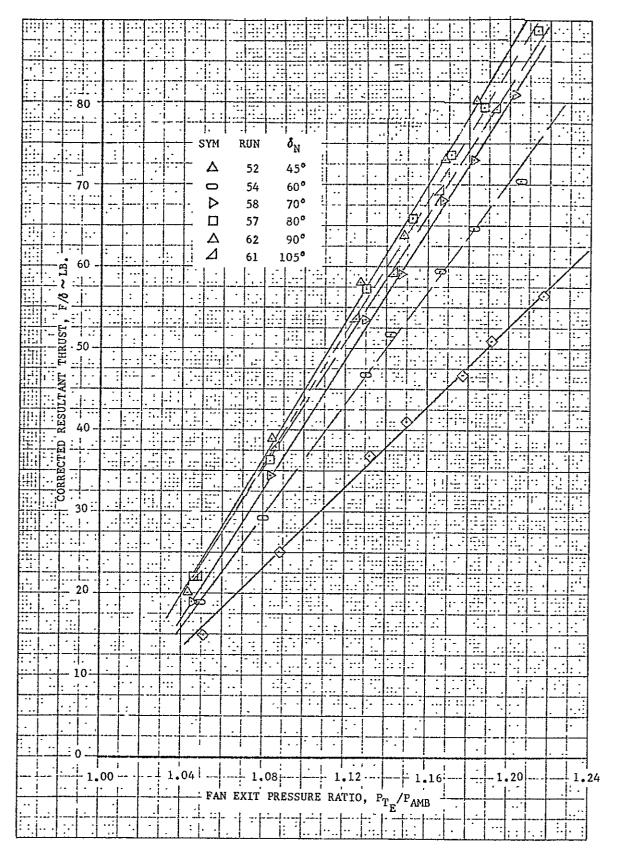


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)
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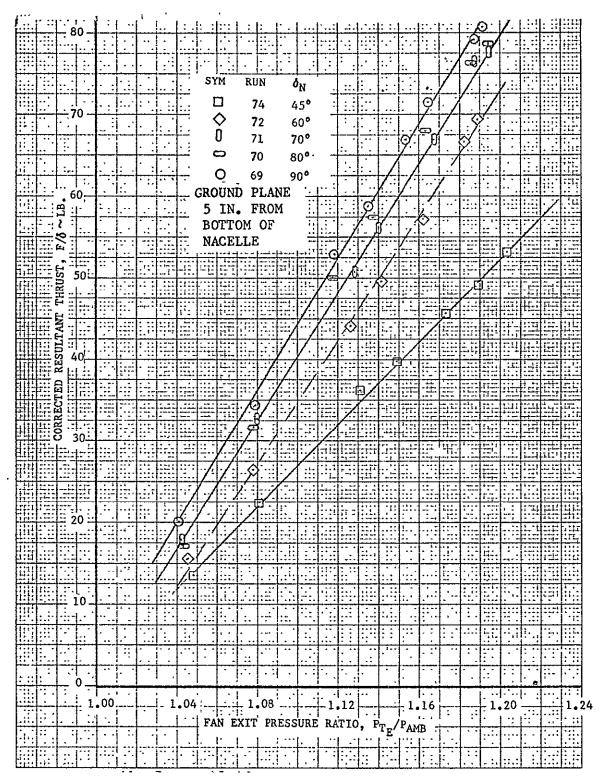


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

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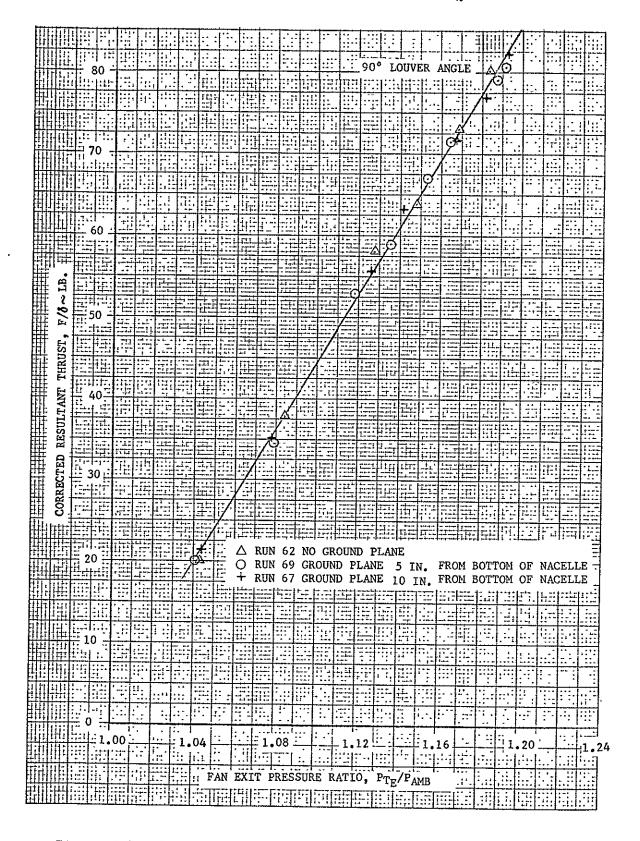


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

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Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued) 469

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Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

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Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

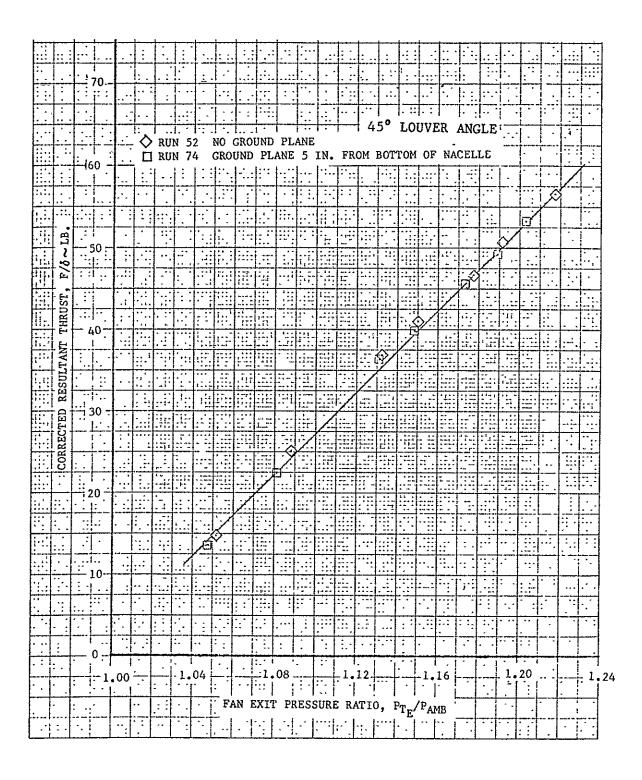


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

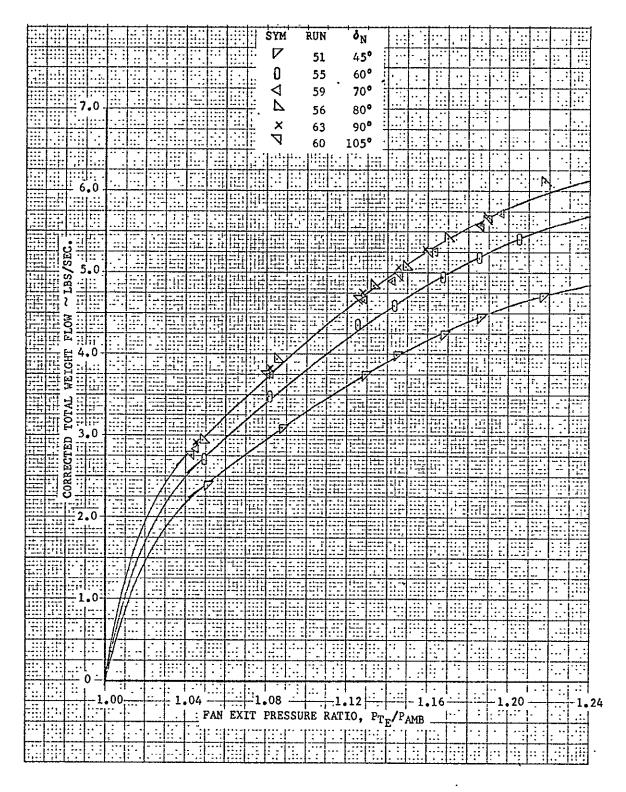


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Continued)

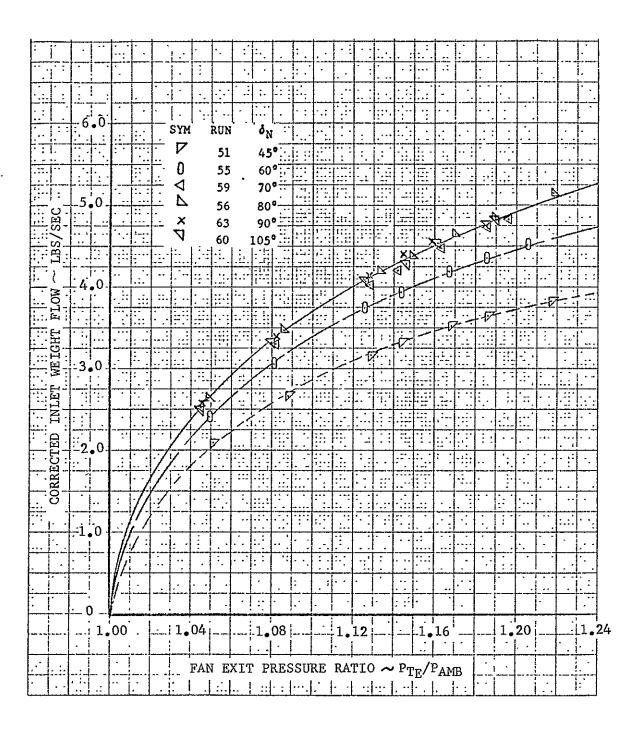


Figure C-5. Fan Calibration, Fan No. 4, Ser. No. 367 (Concluded)

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Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421

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Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued) 476

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Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued)

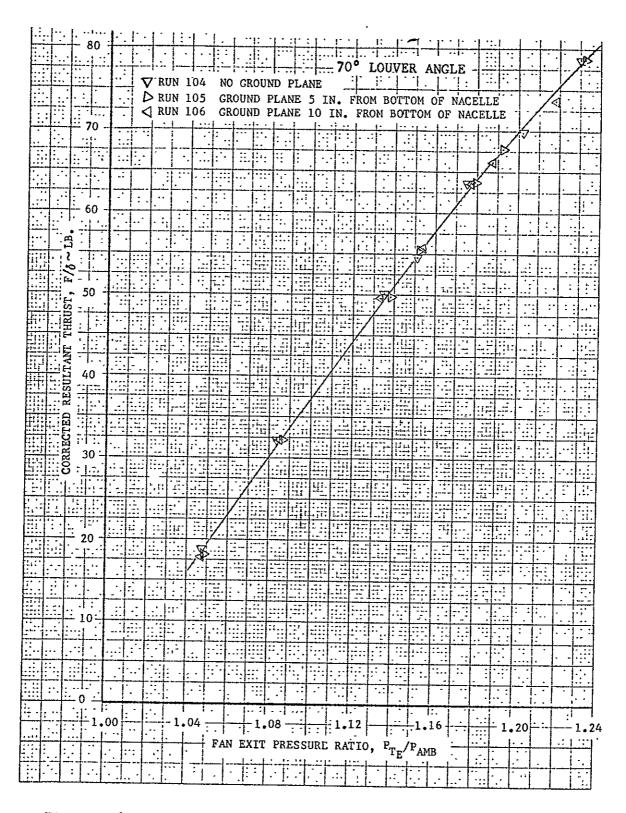


Figure C-6. Fan Calibration, Fan No. 5, Ser. No. 421 (Continued)